THE INDUSTRY'S RECOGNIZED AUTHORITY

ROCK PRODUCTS

MAY
1953

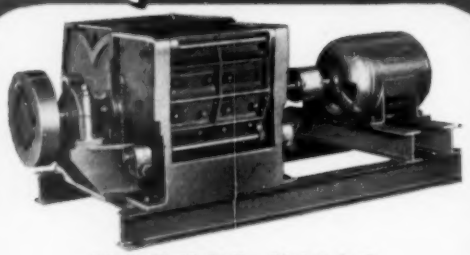
LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD

Suspension Bridge Conveyor, Becker County Sand and Gravel Co., Fayetteville, N.C.

Crush It!
Grind It
Separate It

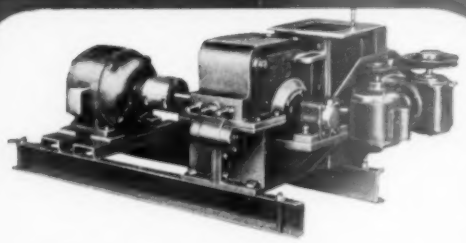
Do It Better, Faster And At Less Cost With...

WILLIAMS



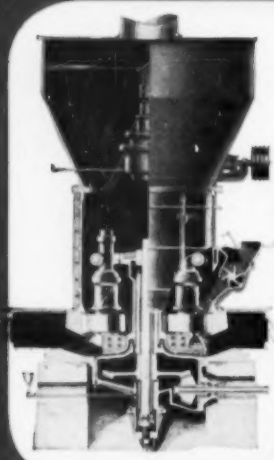
HAMMER MILLS

For heavy duty crushing or grinding of virtually any mineral or chemical—Williams builds them to do *a complete job in one operation!* Primary and secondary crushers are unnecessary—extra foundations, conveyors, other equipment are eliminated! You can save up to 75% on initial investment—up to 50% on grinding costs with the right Williams Hammer Mill!



HELIX-SEAL HAMMER MILLS

For cleaner, safer dustless grinding of dry materials—or non-clogging, accurate grinding of wet, sticky or greasy materials—to finenesses of 100 to 325 mesh. Combines the advantages of a hammer mill with closed-circuit screw-type feed. No separators, fans or cyclones required. Available with steam or water jackets. Low investment—inexpensive to install and operate.



ROLLER MILLS
WITH AIR SEPARATION

For accurate, uniform pulverizing or blending. Instantly adjustable to finenesses down to 400 mesh, even micron sizes. Dries and grinds simultaneously. Automatic, self-adjusting feed. Many other exclusive engineering and construction features. Williams Roller Mills have set new standards for product quality, output and economy.

OTHER WILLIAMS EQUIPMENT

- *IMPACT and DRIER MILLS*
- *AIR SEPARATORS*
- *VIBRATING SCREENS*
- *COMPLETE "Packaged" PLANTS For Installation In Existing Buildings*

At Your Service
WILLIAMS TESTING LABORATORY

Consult Williams on any grinding, crushing, shredding or separation problem, no matter what the material. The most complete testing and research facilities are available without cost or obligation. Simply furnish enough raw material for a test run, and a sample or description of the finished product desired.

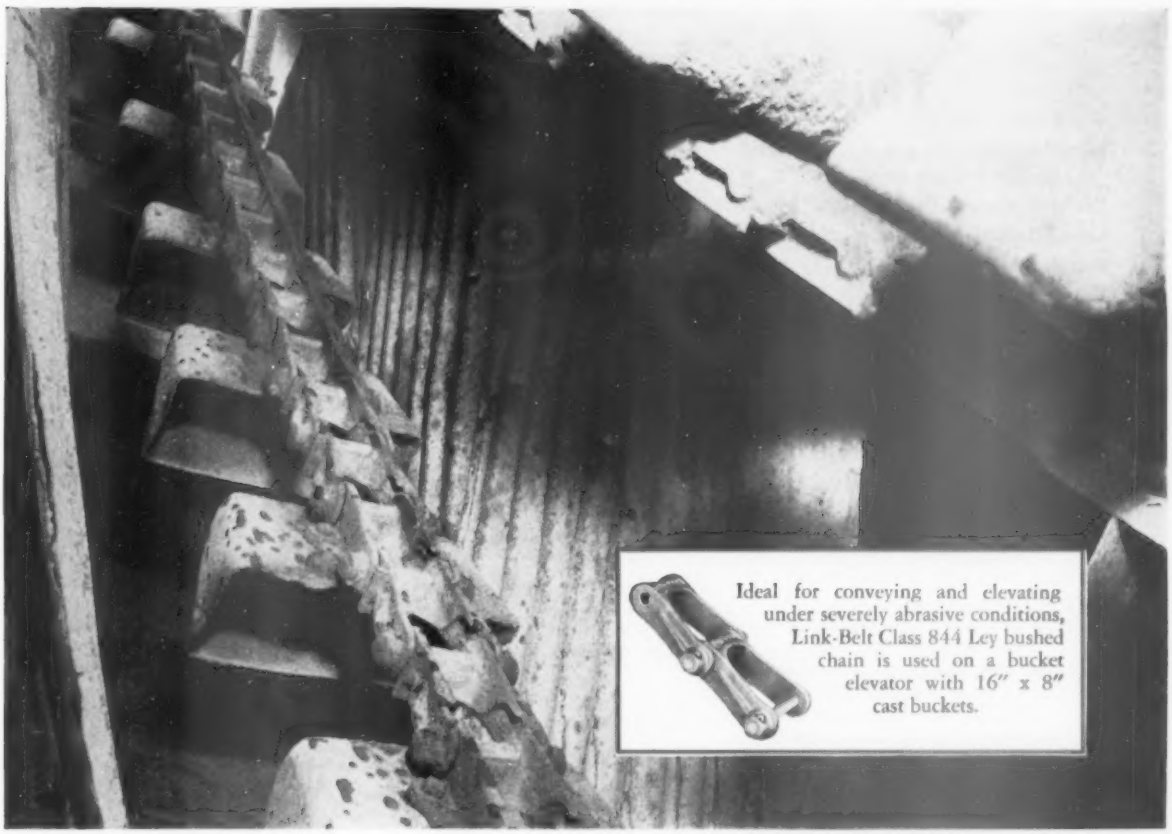
WILLIAMS PATENT CRUSHER & PULVERIZER CO.
800 St. Louis Avenue ST. LOUIS 6, MO.

WILLIAMS

CRUSHERS · GRINDERS · SHREDDERS

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

Is there ONE chain that best meets your drive or conveyor problem?



Ideal for conveying and elevating under severely abrasive conditions, Link-Belt Class 844 Ley bushed chain is used on a bucket elevator with 16″ x 8″ cast buckets.

You'll find the answer in LINK-BELT's complete chain line... a size and type for every job

The application shown above is an example of how you can select the *one* chain best suited for a particular need from the complete Link-Belt line. And each chain is engineered to provide more efficient service at lower cost than so-called general purpose chain.

Whatever your requirements, you are assured of the *right* chain for the job when you rely on Link-Belt. And, remember—a chain bearing the Link-Belt double >—< arrow is your guarantee of longer chain life.

For information on the complete Link-Belt chain line, see the Link-Belt representative near you. He has the answers for efficient, low-cost drive and conveying chain performance.

LINK-BELT

CHAINS AND SPROCKETS

Typical chains from the complete LINK-BELT line

Class SS bushed roller chain with straight sidebars — for practically any conveying or elevating service.

Class SS bushed roller chain with offset sidebars — for heavy drive service at moderate speeds.

Class C combination chain — popular, durable, low cost design for elevators, conveyors.

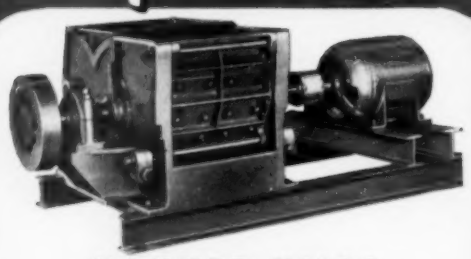
Link-Belt "Flint-Rim" cast sprockets give extra long life. Cast steel sprockets for most severe service.

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities. 13.101-G

Crush It!
Grind It
Separate It

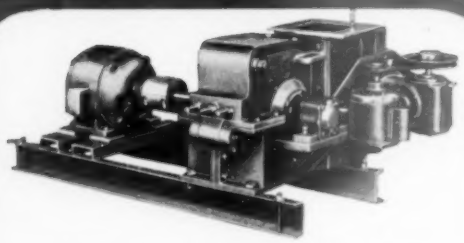
Do It Better, Faster And At Less Cost With...

WILLIAMS



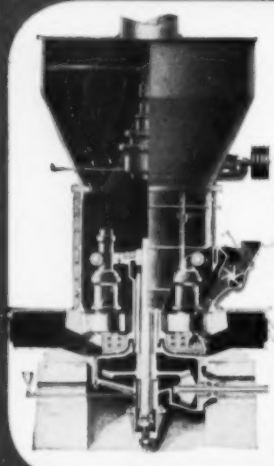
HAMMER MILLS

For heavy duty crushing or grinding of virtually any mineral or chemical—Williams builds them to do *a complete job in one operation!* Primary and secondary crushers are unnecessary—extra foundations, conveyors, other equipment are eliminated! You can save up to 75% on initial investment—up to 50% on grinding costs with the right Williams Hammer Mill!



HELIX-SEAL HAMMER MILLS

For cleaner, safer dustless grinding of dry materials—or non-clogging, accurate grinding of wet, sticky or greasy materials—to finenesses of 100 to 325 mesh. Combines the advantages of a hammer mill with closed-circuit screw-type feed. No separators, fans or cyclones required. Available with steam or water jackets. Low investment—inexpensive to install and operate.



ROLLER MILLS

WITH AIR SEPARATION

For accurate, uniform pulverizing or blending. Instantly adjustable to finenesses down to 400 mesh, even micron sizes. Dries and grinds simultaneously. Automatic, self-adjusting feed. Many other exclusive engineering and construction features. Williams Roller Mills have set new standards for product quality, output and economy.

OTHER WILLIAMS EQUIPMENT

- *IMPACT and DRIER MILLS*
- *AIR SEPARATORS*
- *VIBRATING SCREENS*
- *COMPLETE "Packaged" PLANTS For Installation In Existing Buildings*

At Your Service

WILLIAMS TESTING LABORATORY

Consult Williams on any grinding, crushing, shredding or separation problem, no matter what the material. The most complete testing and research facilities are available without cost or obligation. Simply furnish enough raw material for a test run, and a sample or description of the finished product desired.

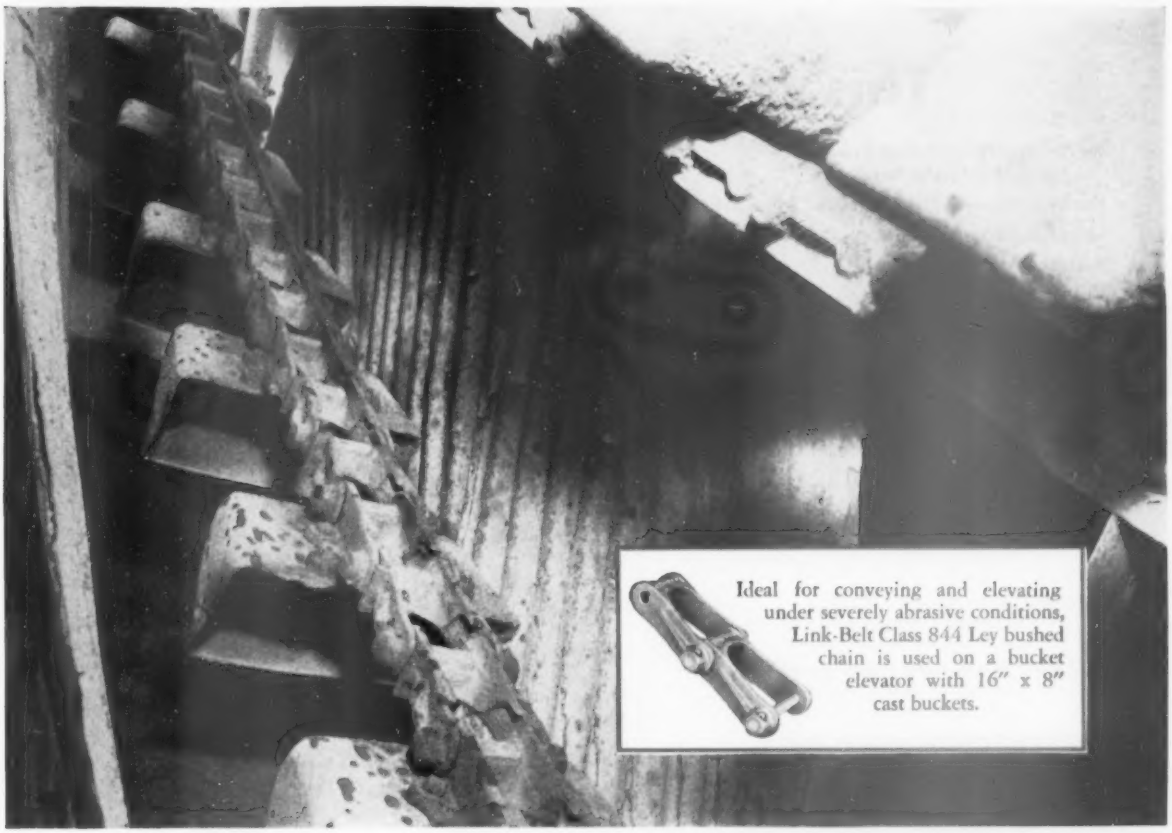
WILLIAMS PATENT CRUSHER & PULVERIZER CO.
800 St. Louis Avenue — ST. LOUIS 6, MO., U.S.A.

WILLIAMS

CRUSHERS — GRINDERS — SHREDDERS

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

Is there ONE chain that best meets your drive or conveyor problem?



Ideal for conveying and elevating under severely abrasive conditions, Link-Belt Class 844 Ley bushed chain is used on a bucket elevator with 16″ x 8″ cast buckets.

You'll find the answer in LINK-BELT's complete chain line... a size and type for every job

The application shown above is an example of how you can select the *one* chain best suited for a particular need from the complete Link-Belt line. And each chain is engineered to provide more efficient service at lower cost than so-called general purpose chain.

Whatever your requirements, you are assured of the *right* chain for the job when you rely on Link-Belt. And, remember—a chain bearing the Link-Belt double >—< arrow is your guarantee of longer chain life.

For information on the complete Link-Belt chain line, see the Link-Belt representative near you. He has the answers for efficient, low-cost drive and conveying chain performance.

LINK-BELT

CHAINS AND SPROCKETS

Typical chains from the complete LINK-BELT line

Class SS bushed roller chain with straight sidebars — for practically any conveying or elevating service.

Class SS bushed roller chain with offset sidebars — for heavy drive service at moderate speeds.

Class C combination chain — popular, durable, low cost design for elevators, conveyors.

Link-Belt "Flint-Rim" cast sprockets give extra long life. Cast steel sprockets for most severe service.

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities. 13.181-G

MAY, 1953

ROCK PRODUCTS

THE INDUSTRY'S RECOGNIZED AUTHORITY

VOL. 56, No. 5

Bror Nordberg
Editor

Nathan C. Rockwood
Editorial Consultant

This Month

We Hear 33

Editorial—Unworkable Provisions in Motor Vehicle Tax Laws 45

Rocky's Notes—The Virtues of Air-Entrained Concrete 47

Labor Relations Trends 49

People in the News 51

Industry News 55

Hints and Helps 60

New Machinery 62

Control Slurry Viscosity with Additive 64
Missouri Portland Cement Co., St. Louis, Mo., cuts down water content of shale slurry by using sodium tripoly phosphate as deflocculating agent
John Romig and Bruce Kester

Increase Sand and Gravel Plant Capacity 68
Janesville Sand and Gravel Co., Janesville, Wis., celebrates completion of plant expansion and office modernization program
Ralph S. Torgerson

Moving Large Crushing Plant 71

Rotary Kiln Loading 72
A useable formula for determining flow of material in rotary lime kiln
Irving Warner, Sr.

Accident Prevention Program that Works 74
Part II. Top Management's Support—no safety program is effective without it
Lea P. Warner, Jr.

Truckers Promote Agstone Sales 78
Maymead Lime Co., Shouns, Tenn., trains new drivers by having experienced operator accompany them on trips. Plan contest for truck slogans
L. David Minsk

Celebrate Winning of Safety Trophy 80
Lyman-Richey Sand and Gravel Corp., Omaha, Neb., operating 12 dredge plants, has achieved outstanding safety record
Bror Nordberg

Theory and Practice of Lime Manufacture 84
Part IV. Factors governing the time of calcination of limestone
Victor J. Azbe

Merchandising Production of Sand and Gravel Through Sales Company 88
Chas. E. Brady

Indiana Mineral Aggregates Meeting 91

Gradation and Composition of Indiana Gravels 92
John B. Patton

Crushing Practice and Theory 96
Part XV. Selection of secondary and reduction crushers
Brownell McGrew

Limestone Pays When Properly Used 104

Pressure Pipe Project in Pakistan 145
F. L. Fitzpatrick

Producing Block with Smooth Marble Aggregate Faces 148

Curing System for Quality Block 151
Quillian's Concrete Co., Daytona Beach, Fla., constructs block plant to produce units having less than 20 percent moisture absorption
Lowell Roberts

Air-Entrained Concrete 154
James A. Nicholson

Producing Pipe for Seattle Water Project 157
A. R. MacPherson

R. S. Torgerson, Managing Editor
Walter B. Lenhart, Associate Editor
Jay A. Poll, Associate Editor
M. K. Smith, Assistant Editor
E. M. Amacher, Assistant Editor
N. G. Longo, Assistant Editor

Contributing Editors

Victor J. Azbe
F. O. Anderegg
M. W. Loving
James A. Barr, Jr.

Home Office

P. D. Allen, General Manager
Mary A. Whalen, Subscription Dir.
C. M. Hancock, Production Manager
C. P. Teats, Field Representative

District Offices

Eastern Area—Morgan K. Cottingham, Manager; Raymond E. Keine, Assistant, 522 Fifth Ave., New York 36, Tel. Murray Hill 2-7888.

Central Area—R. P. Keine, Manager, Hanna Bldg., Cleveland 15, Tel. Main 1-4362.

Midwest Area—E. H. Hickey, Representative, 309 W. Jackson Blvd., Chicago 6, Tel. Harrison 7-7890.

Western Area—L. C. Thaon, Manager, 309 West Jackson Blvd., Chicago 6, Tel. Harrison 7-7890.

Pacific Area—Duncan Scott & Co., Mills Bldg., San Francisco 4, Tel. Garfield 1-7950. In Los Angeles 5, 2978 Wilshire Blvd., Tel. Dunkirk 8-4151.

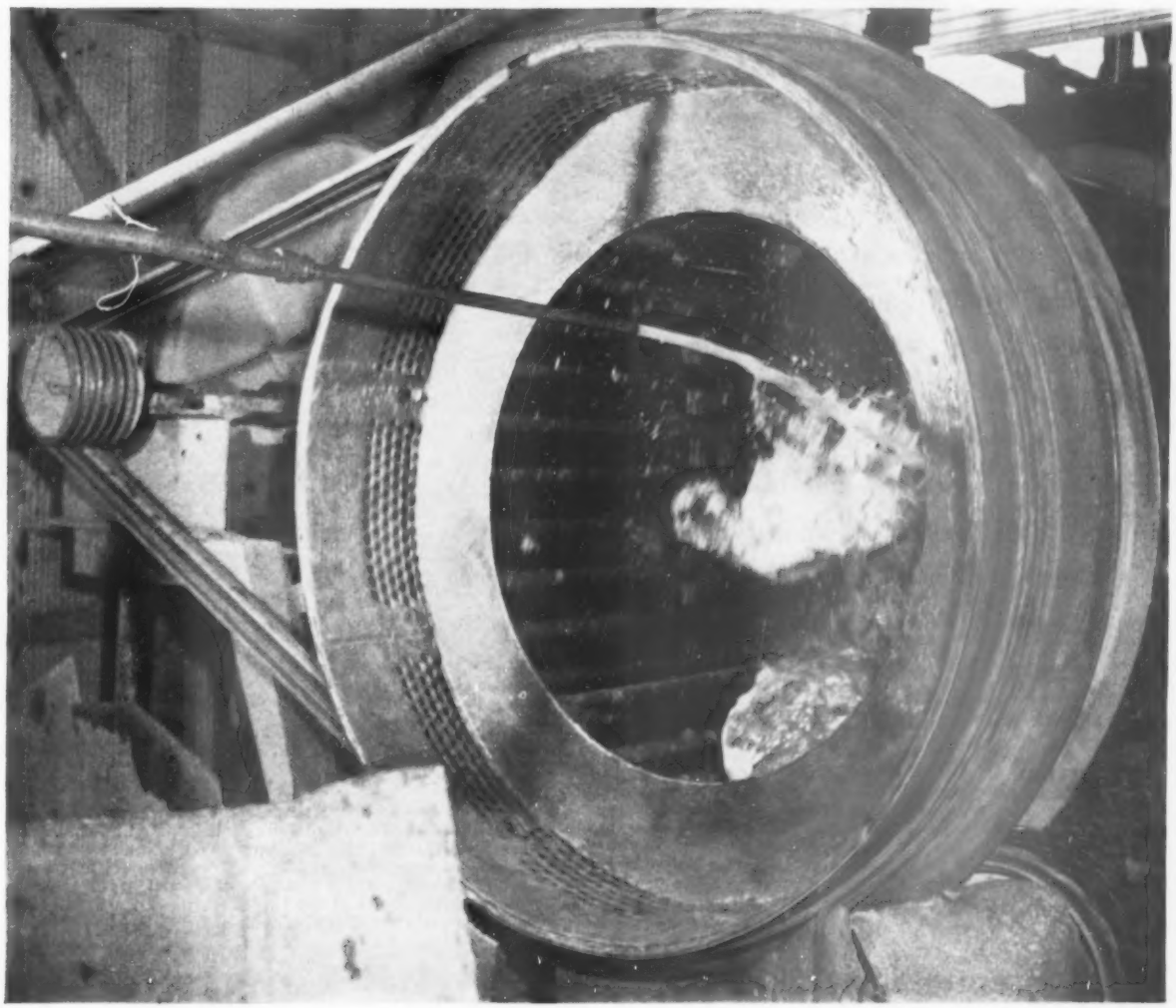
London, England—Harold F. Charles, Managing Director, Maclean-Hunter, Ltd., Wellington House, 125 Strand, London, W.C. 2.

ROCK PRODUCTS is published monthly by MACLEAN-HUNTER Publishing Corporation, 309 West Jackson Blvd., Chicago 6, Illinois; Horace T. Hunter, President; P. D. Allen, Vice-President; Ralph K. Davis, Secretary. Copyright, 1953. Entered as second-class matter, Jan. 30, 1936, at the Chicago, Ill. post office under the act of Mar. 3, 1879. Additional entry at Long Prairie, Minn. ROCK PRODUCTS is indexed regularly by Engineering Index, Inc. and the Industrial Arts Index.

SUBSCRIPTION INFORMATION
Subscription Price: United States and Possessions, Canada one year, $2.00; two years, $3.00; three years, $4.00. Pan American, one year, $4.00; two years, $7.00; three years, $10.00. All other foreign one year, $6.00; two years, $11.00; three years, $15.00. Twenty-five cents for single copies. Canadian subscriptions and remittances may be sent in Canadian funds to ROCK PRODUCTS, P. O. Box 100, Terminal "A," Toronto, Canada.

To Subscribers—Date on wrapper indicates issue with which your subscription expires. . . In writing to have address changed, give old as well as new address.

RESEARCH KEEP **B.F.Goodrich** FIRST IN RUBBER



2-foot rocks will some day be glass

A typical example of B. F. Goodrich improvement in rubber

THAT cagelike contraption spins like a top all day long, breaking big rocks into little ones. The rock is a special kind used in making glass. The chunks are sometimes 18 or 24 inches thick.

But just picture the jar every time another load of boulders is dumped in, and the shock to the V belts used to turn the breaker. The jolting action caused ordinary belts to wear out too soon—usually after only two months' work. An entirely new kind of belt was needed, one that could stand shocks and strain.

The owner had heard about the grommet belt developed by B. F. Goodrich to give V belt users more for their money. A *grommet* is a cord loop inside the belt. It is made like a giant twisted cable except that it's endless—no splices or overlaps. The grommets make it a flexible belt but one that stands shocks and heavy loads far better than ordinary belts. No other kind of belt has grommets; no other belt stands so much punishment or lasts so long.

The B. F. Goodrich grommet belts were installed, and last 30% longer than any other belt ever used before.

This performance is typical, not an unusual case at all. It's the result of a policy at B. F. Goodrich—the policy of constant product improvement, of never considering a product "good" enough. If you use rubber belting, hose or other industrial rubber goods, it will pay you to check with your BFG distributor before you buy to see if you, too, can save money because of B. F. Goodrich research. *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.*

B.F.Goodrich
RUBBER FOR INDUSTRY

ANSWERING THE CALL FOR GREATER OUTPUT

It takes truly modern equipment to keep pace with today's stepped-up demands — and do it at an operating cost which insures fair and consistant profits. This line of Allis Chalmers equipment has been designed and built completely new since the war, with the kind of advanced engineering that delivers big-capacity performance at a minimum of maintenance costs. It is the line that's Designed For Your Job . . . Built To Take It . . . Easy To Operate . . . Easy To Service.

Flexible Excavators and Loaders. Front-mounted hydraulic shovels for all four models of Allis-Chalmers crawler tractors handle many excavating jobs, load trucks, other hauling units . . . feed hoppers and conveyers. Buckets range from one cubic yard on the HD-5G to four cubic yards on the HD-20G. Special rock buckets and rock forks are also available.

Shock Troops Of Production. Crawler tractors equipped with bulldozers handle countless stripping, excavating and other earth-moving jobs. Wide choice of bulldozers—straight or angled, cable or hydraulic — assure the right combination for maximum production on every job . . . enables users to strip overburden previously thought too deep to tackle profitably. Allis-Chalmers offers a choice of four crawler tractors to meet your needs from the 40 hp. HD-5 to the giant HD-20 with torque converter drive and 175 net engine hp.

Fast, Self-Hauling Scrapers. On stripping, hauling and dumping jobs, Allis-Chalmers Motor Scrapers move big yardage "on the double." These job-tested, job-proved machines have unusually high horsepower-to-yardage ratios, assuring top-average haul speeds even when loaded and on adverse grades. Their clean, open-top design also permits easy shovel loading. Other features, such as positive, forced ejection, high clearance, hydraulic power steering and simplified servicing add still further to production output. Model TS-200 has a 10 cu. yd. struck and 13 cu. yd. heaped capacity; TS-300 has a 14 cu. yd. struck and 18 cu. yd. heaped capacity.

Road Builders and Maintainers. Low-cost, tandem drive Model D easily handles maintenance as well as many construction jobs. With exclusive ROLL-AWAY moldboard, tubular frame and other high-production features, it gives big grader performance advantages at a fraction of the usual cost. For heavy grading and construction, four diesel powered models are available.

Your Allis-Chalmers dealer invites you to stop in and discuss your job requirements. He will be glad to help you select the right machine for your needs.

Tough, Speedy Hauling Units. Model TR-200 rear-dump Motor Wagon is built to take rock-shock. Double steel floor is reinforced with heavy oak plank. Front and sides are channel ribbed to provide rigidity. Clean interior, high 70-degree tilt plus constant wheel-base insures fast, safe and complete load ejection. Wagon body is interchangeable with TS-200 Scraper Body. Model TW-300 bottom-dump Motor Wagon is interchangeable with TS-300 Scraper Body.

For Big Stripping Jobs. Allis-Chalmers tractors team up with pull-type scrapers to handle big stripping and stockpiling jobs. Your Allis-Chalmers dealer offers a choice of seven models to fit every tractor and every job. Struck capacities range from two to 18 cu. yd.

ALLIS-CHALMERS
TRACTOR DIVISION—MILWAUKEE 1, U.S.A.

ROLL-AWAY is an Allis-Chalmers trademark.

drive it anywhere

—get faster set-ups, better hole spacing, greater footage, better fragmentation, lower costs

Le Roi-CLEVELAND

T286 Self-Propelled Dual Drill Rig

It's 2 Le Roi-CLEVELAND patented air feeds and drills with air-motor booms mounted on a 25-hp tractor

3 speeds forward — 1 speed reverse

USE a Le Roi-CLEVELAND T286 and watch your men go places — go places they couldn't get to before on wagon-drill jobs. The T286 is self-propelled; you can drive it over almost any terrain — and tow the compressor right along behind. Your men can make their set-ups faster — spot holes easier for better fragmentation — without tugging or pushing.

Besides being self-propelled, the T286 drills in any direction — at any angle — uses less air. One Le Roi Airmaster 600 cfm Compressor provides all the low-cost air you need.

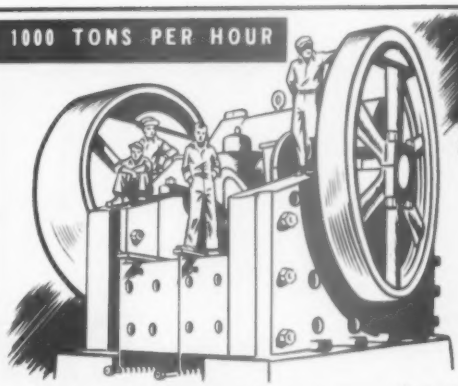
Have your nearby Le Roi distributor tell you *all* the reasons why it pays to use the Le Roi-CLEVELAND T286 Self-Propelled Dual Drill Rig. Write for Bulletin RD-21.

LE ROI COMPANY

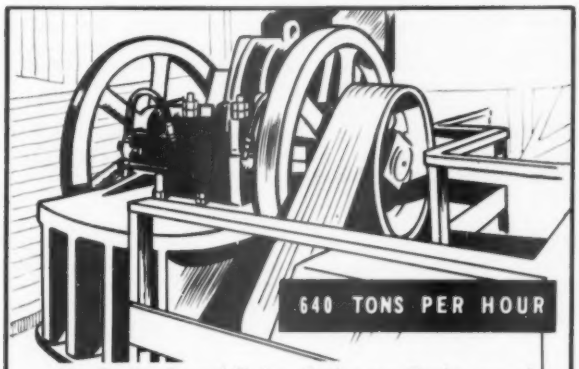
CLEVELAND ROCK DRILL DIVISION 12500 Berea Road, Cleveland 11, Ohio

Plants: Milwaukee, Cleveland and Greenwich, Ohio

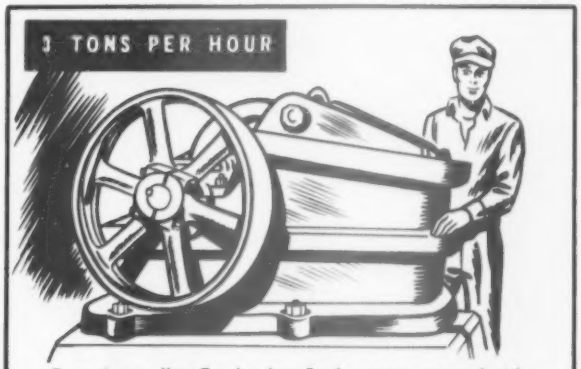
What Capacity Do You Need?



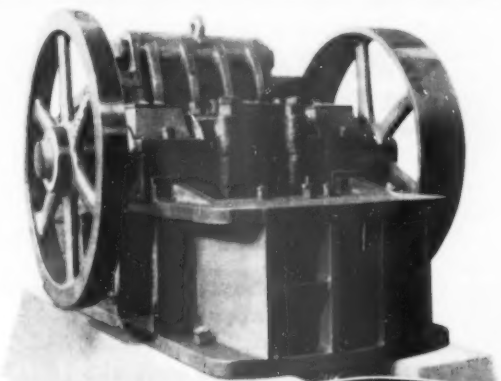
Plants requiring huge daily production will find the Traylor "S" Jaw Crusher, with its curved jaw plates, built for continuous, heavy-duty operation.



The Traylor Type HB Jaw Crusher has Traylor curved jaw plates as standard equipment. This assures long, efficient operation with reduced power requirements for greater profits.



Even the smallest Traylor Jaw Crushers are equipped with curved jaw plates. This means that even lesser volumes may be crushed more profitably with a Traylor Type M Crusher.



A **Traylor** LEADS TO GREATER PROFITS

INCREASE your profits by selecting a Traylor Jaw Crusher that will operate at its most efficient rate of production in meeting your requirements. Send today for complete specifications and descriptions of Traylor Jaw Crushers.

Daily Production Requirements: _____

Name: _____

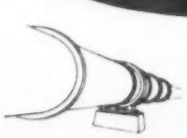
Position: _____

Company: _____

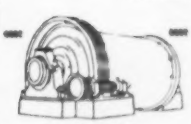
Address: _____ State: _____

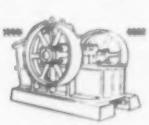
TRAYLOR ENGINEERING & MANUFACTURING CO.
575 MILL ST., ALLENTOWN, PA.
SALES OFFICES: New York • Chicago • San Francisco
Canadian Mfrs: Canadian Vickers, Ltd., Montreal, P.Q.

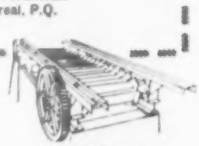
Primary Gyratory Crushers


Rotary Kilns

Secondary Gyratory Crushers


Ball Mills


Jaw Crushers


Apron Feeders

CUT RAW GRINDING COSTS

with

B&W Type B Pulverizers

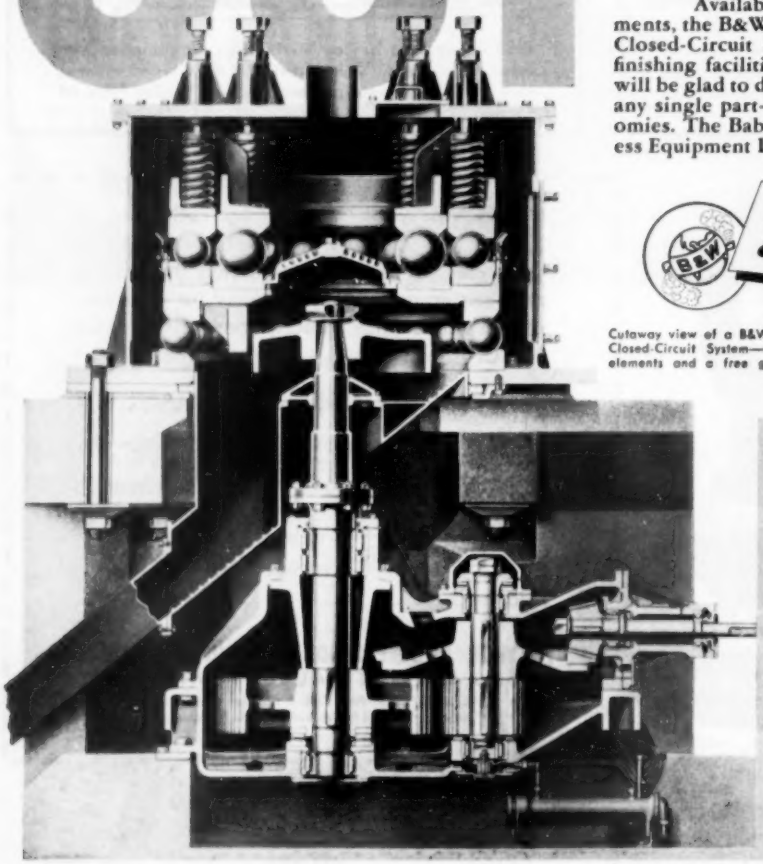
POWER DEMAND With grinding elements operating on the ball-bearing principle and with an extremely low friction loss, the B&W Type B Pulverizer delivers maximum capacity of product with low power demand.

MAINTENANCE COSTS Uniform, self-equalizing wear of the tough, alloy, grinding elements assures low maintenance throughout their long life. Easy access facilitates replacements when finally necessary.

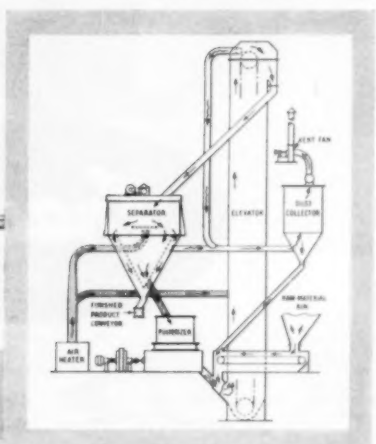
SPACE REQUIREMENTS Powerful yet compact, the Type B Mill provides far higher capacity in equal space . . . can replace other types without additional structure.

Available in sizes suitable to all capacity requirements, the B&W Type B Pulverizer is the heart of the B&W Closed-Circuit System. If you plan to expand your rock finishing facilities or modernize present equipment, B&W will be glad to discuss your plans—from first to last grind or any single part—in terms of increased raw grinding economies. The Babcock & Wilcox Company, Boiler Div., Process Equipment Dept., 161 East 42nd St. New York 17, N. Y.

BABCOCK & WILCOX



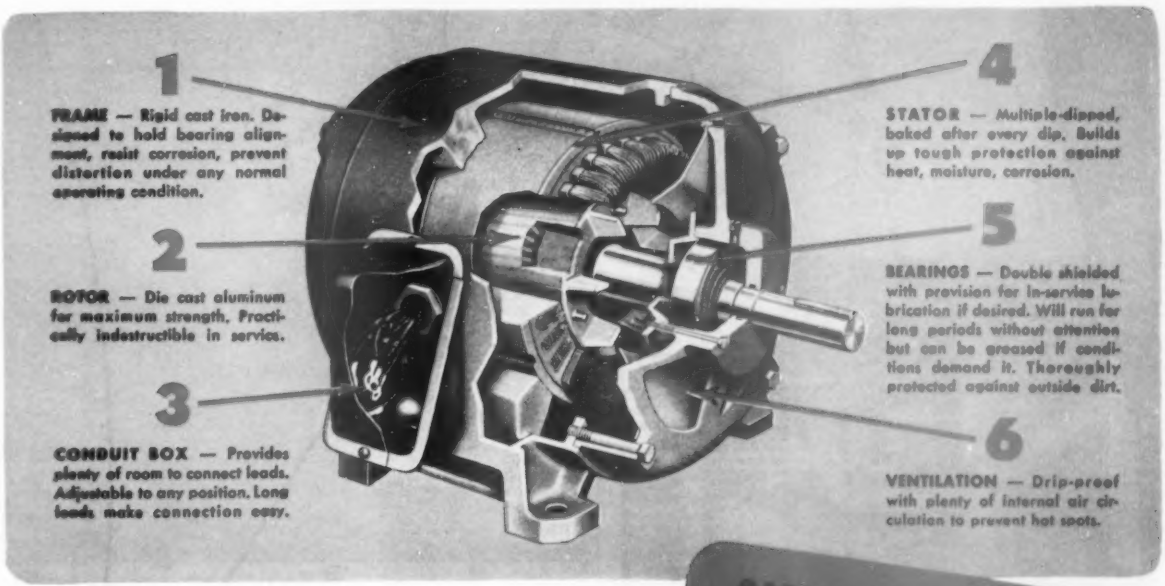
Cutaway view of a B&W Type B Pulverizer—heart of the B&W Closed-Circuit System—which employs three sets of grinding elements and a free gravity discharge.



Diagrammatic arrangement of equipment in typical B&W Closed-Circuit Drying and Grinding System.

C-204

Look for These 6 Signs of Good Motor Design



1 **FRAME** — Rigid cast iron. Designed to hold bearing alignment, resist corrosion, prevent distortion under any normal operating condition.

2 **ROTOR** — Die cast aluminum for maximum strength. Practically indestructible in service.

3 **CONDUIT BOX** — Provides plenty of room to connect leads. Adjustable to any position. Long leads make connection easy.

4 **STATOR** — Multiple-dipped, baked after every dip. Builds up tough protection against heat, moisture, corrosion.

5 **BEARINGS** — Double shielded with provision for in-service lubrication if desired. Will run for long periods without attention but can be greased if conditions demand it. Thoroughly protected against outside dirt.

6 **VENTILATION** — Drip-proof with plenty of internal air circulation to prevent hot spots.

Get Allis-Chalmers Motors for these Extra Values!

ALLIS-CHALMERS **MOTORS**

Certified Service — Nearly 100 Allis-Chalmers Certified Service Shops provide factory-approved parts and service on your Allis-Chalmers motors. Screened for modern equipment, adequate experience and business integrity, these independently owned service shops will provide you with prompt, economical repair and maintenance.

Complete Drives from One Source — Allis-Chalmers can supply your complete drive — motor, control and *Texrope* V-belt drive — from one convenient, reliable source.

Application Engineering — Your Allis-Chalmers District Office representative or Authorized Dealer will be glad to help you select exactly the right motors for your needs. For additional information, write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B6052. A-3954

Texrope is an Allis-Chalmers trademark.

Sold . . .
Applied . . .
Serviced . . .

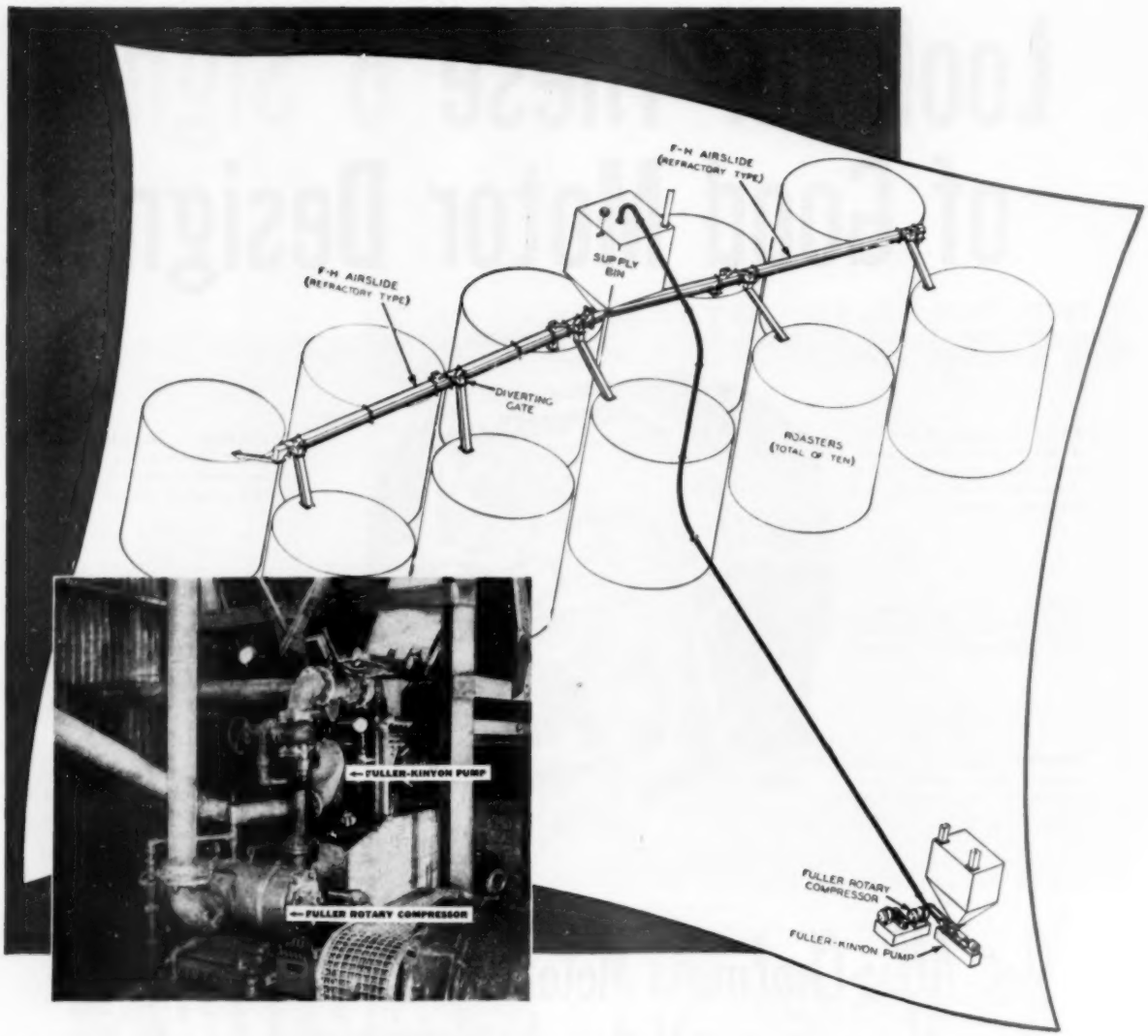
by Allis-Chalmers Authorized Distributors, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE V-belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.

PUMPS — Integral types from ¾ in. to 72 in. discharge and up.

ALLIS-CHALMERS



Conveying "Hot Stuff" at Noranda Mines--- with Fuller-Kinyon Pump and F-H Airslides

Problem: To convey hot flue dust from Cottrell precipitator collecting hoppers, and distribute uniformly to ten roasters, without dust or loss.

Solution: After long and careful study by both Noranda and Fuller engineers, it was decided to install a Fuller-Kinyon Conveying System as the most practical and efficient method of conveying from the precipitator to a supply bin. A Fuller-Kinyon Pump, with water-cooled seal, handles this flue dust at temperatures up to 800 deg. fahr., at rate of 25 tons an hour, in a highly satisfactory manner, through a conveying line of approximately 220 feet. From the supply bin, F-H Airslides, of the refractory type, convey and distribute the material to the roasters, with no dust or loss.

A Fuller Rotary Single-stage Compressor furnishes approximately 478 c.f.m. of air at 15-lb. pressure, to the Fuller-Kinyon Pump, through a direct-connected air line.

When your problem is conveying dry, pulverized materials, why not have a Fuller engineer make a study of your requirements. His findings may result in savings you never anticipated or thought possible. Write us today!

FULLER COMPANY, Catasauqua, Pa.

Branch offices

Chicago—San Francisco—Los Angeles—Seattle—Birmingham

G-51
1967

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS—COMPRESSORS AND VACUUM PUMPS—FEEDERS AND ASSOCIATED EQUIPMENT

He works his quarry with "thoroughbreds"

HOWARD E. MARKS, owner of the Skyline Quarry, near Belmont, Calif., has had Caterpillar equipment since 1922. "We find Caterpillar machines are real thoroughbreds. We're 100% owners of Cat* products, and plan to stay that way," he says.

The Caterpillar DW10 with matching No. 10 Scraper is one of Mr. Marks' "thoroughbreds." His other Caterpillar machines include two track-type tractors, two motor graders and a ripper. The quarry produces 4,000 tons daily of base rock and concrete aggregate, and also has an asphalt plant.

This Cat DW10 Tractor can highball at 24.5 m.p.h. for fast, low-cost cycle times. Its rugged Diesel engine delivers real power on inexpensive No. 2 furnace oil. The companion No. 10 Scraper hauls a heaped load of 11 yards, and, being cable operated, loads smoothly and can pump "dead" material. Positive ejection spreads the load quickly and evenly. With its sharp turning ability, stability in rough going, and excellent operator visibility both front and rear, the combination of Cat DW10 Tractor and No. 10 Scraper is a "natural" for work in mines and quarries.

Your Caterpillar Dealer will gladly demonstrate the fast-hauling tractor and scraper that best fit your needs. And you can depend on him to provide skilled service and genuine factory parts for the machines he sells. Call him today.

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

A 20' long, 11'6" wide nodulizer section of a 10' x 150' Rotary Kiln ready for shipment from the Standard plant.

L-O-N-G ON RUGGEDNESS

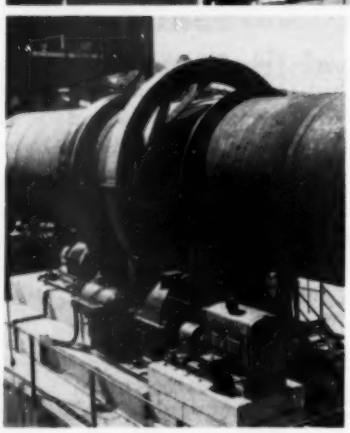
STANDARD **KILNS—CALCINERS COOLERS—DRYERS**

The illustrations shown here give added proof of the time-tested slogan—"It Pays to STANDARD-IZE". Here is just another example of Standard's ability to produce *rugged* rotary equipment for *any* job, large or small.

From all over the country—North, East, South, West — whenever the need is for dependability—the call is for Standard. See for yourself why the list of satisfied Standard users grows every day.

With over 50 years of precision engineering behind it, Standard is ready to help solve your problems—here or abroad. Write today for the complete Standard Story.

A small section of the kiln, installed and in use at a large western manganese company.



A close-up view of the same kiln. Note the solid construction. Standard Kilns are built to last.

STANDARD STEEL CORPORATION

5036 Boyle Ave., Los Angeles 58 ● 7 East 42nd St., New York 36

Progress in Motor Grader Design

Allis-Chalmers new AD-40 shows importance of visibility. Operator can see front wheels — both ends of blade while he works.

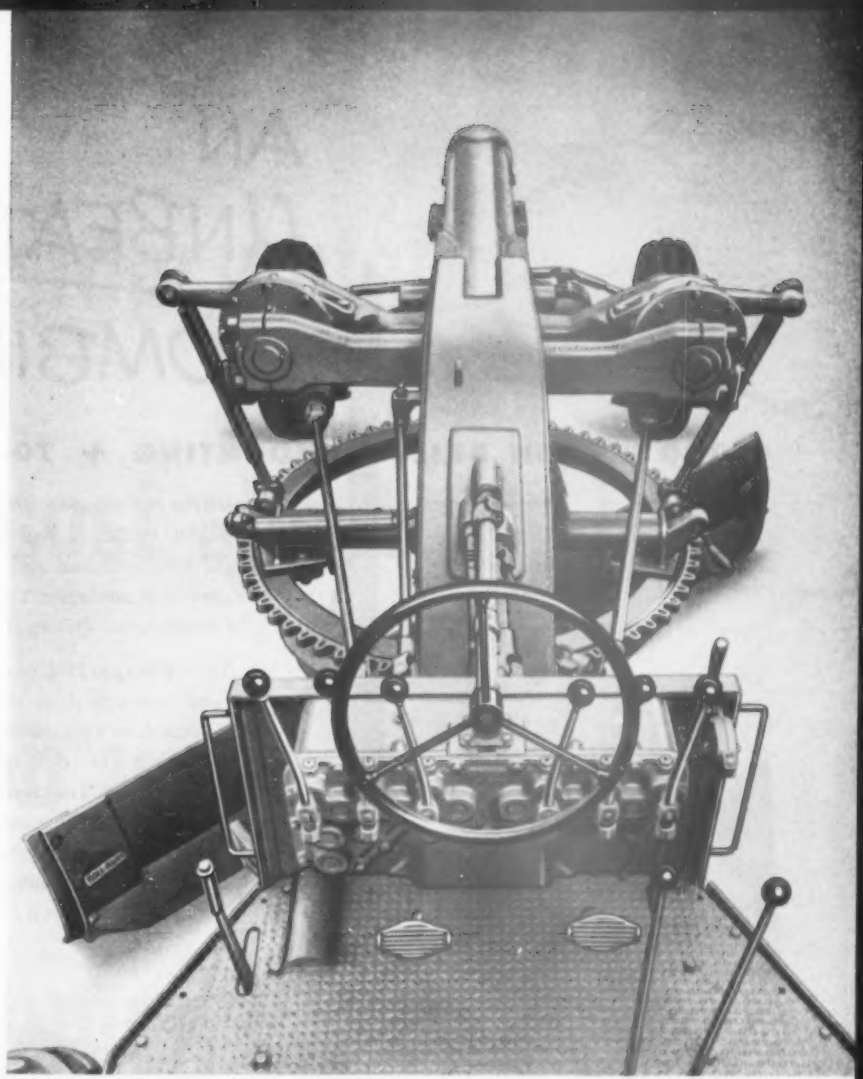
A MOTOR grader operator has to be able to see his work to do a good job. This is of prime importance in building and maintaining haul roads.

Here is how Allis-Chalmers engineers made sure the new AD-40 met these requirements. They carried A-C's single member frame all the way from the front axle to the platform; cut down the size of the lift cases to eliminate blind spots; lowered the control box and eliminated assemblies from the front panel to provide better visibility of the work area directly in front of the operator; tapered the front edges of the platform so that he could see both ends of the moldboard as he works.

There is not only ample leg room for stand-up operation but the steering wheel height is adjustable and the seat rolls forward at a touch for sit-down operation.

Combined with a new kind of power steering, these advanced design features are making Allis-Chalmers AD-40 an increasing favorite with operators and owners alike because it means more work done with less effort. For more facts on the AD-40, it will pay you to see your nearby Allis-Chalmers dealer.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.



(above) Here is actual view operator has from platform of Allis-Chalmers AD-40, showing how well he can see both ends of the blade and both front wheels.

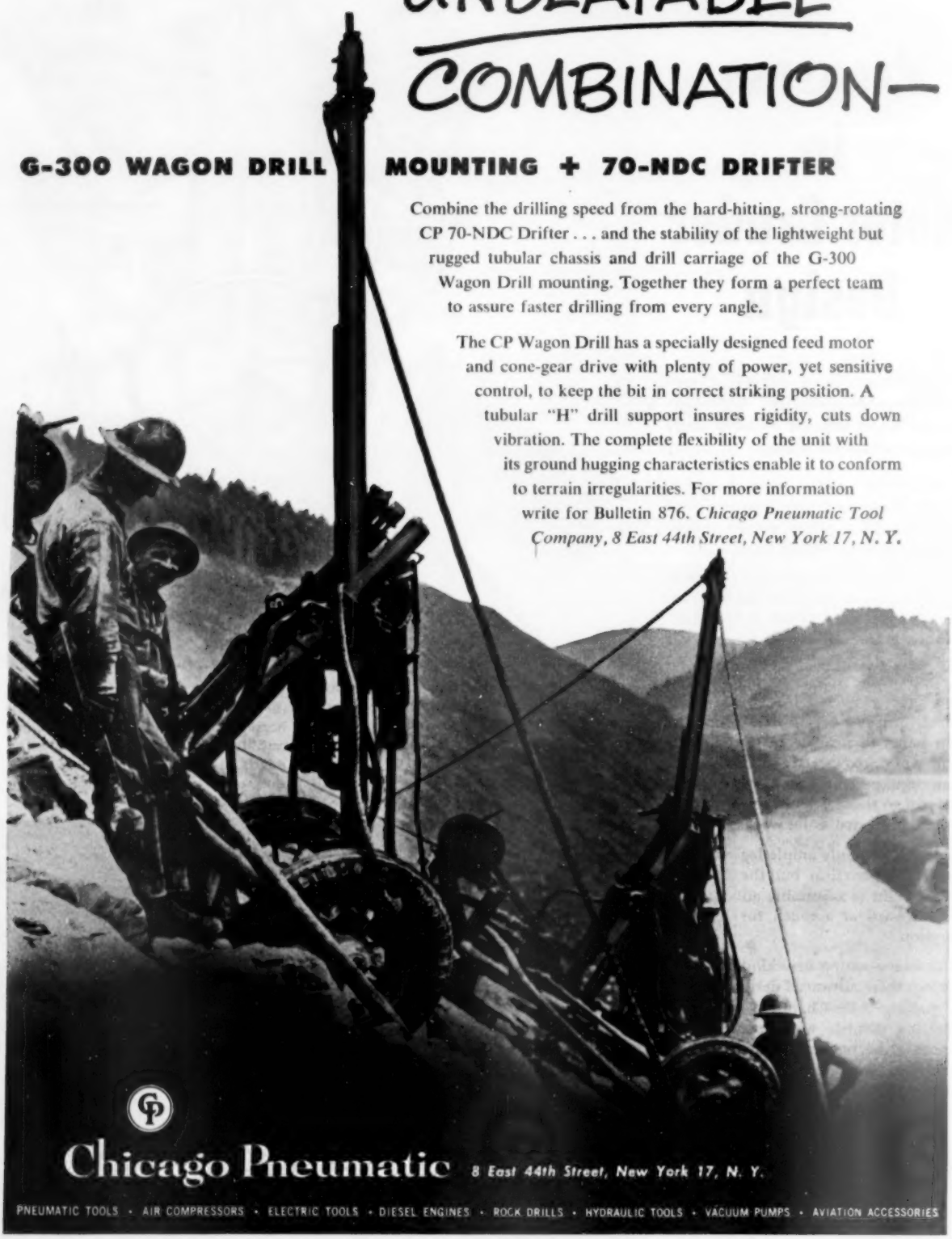
(below) The AD-40 has 104 brake horsepower, 23,000 pounds of weight and tandem drive traction, all it needs to do a better job on heavy duty construction . . . a faster job on maintenance.

AN UNBEATABLE COMBINATION—

G-300 WAGON DRILL MOUNTING + 70-NDC DRIFTER

Combine the drilling speed from the hard-hitting, strong-rotating CP 70-NDC Drifter . . . and the stability of the lightweight but rugged tubular chassis and drill carriage of the G-300 Wagon Drill mounting. Together they form a perfect team to assure faster drilling from every angle.

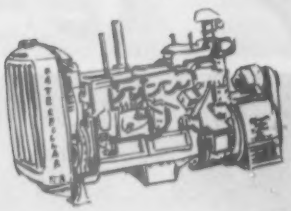
The CP Wagon Drill has a specially designed feed motor and cone-gear drive with plenty of power, yet sensitive control, to keep the bit in correct striking position. A tubular "H" drill support insures rigidity, cuts down vibration. The complete flexibility of the unit with its ground hugging characteristics enable it to conform to terrain irregularities. For more information write for Bulletin 876. *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.*

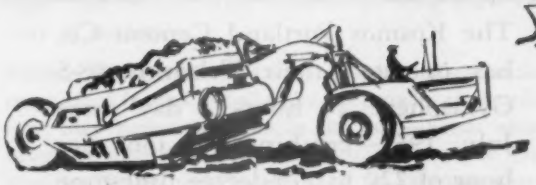


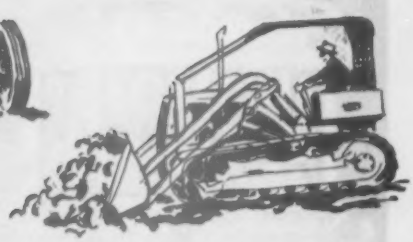
Chicago Pneumatic 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Use your stop watch and your cost sheet on your job with CAT* equipment







THERE's one way to find out whether you're making all the profit you're entitled to. Get out your stop watch and cost sheets. Tally your cycle times and production figures. Check your down time and the resale value of your machines. These figures will convince you of Caterpillar superiority.

Your Caterpillar Dealer will give you an on-the-job demonstration. Fair enough? Call him today.

Caterpillar Tractor Co., Peoria, Illinois.

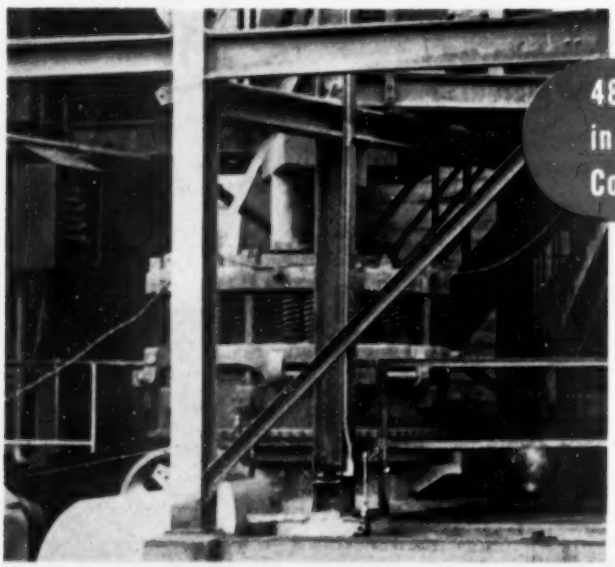
CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

TELSMITH

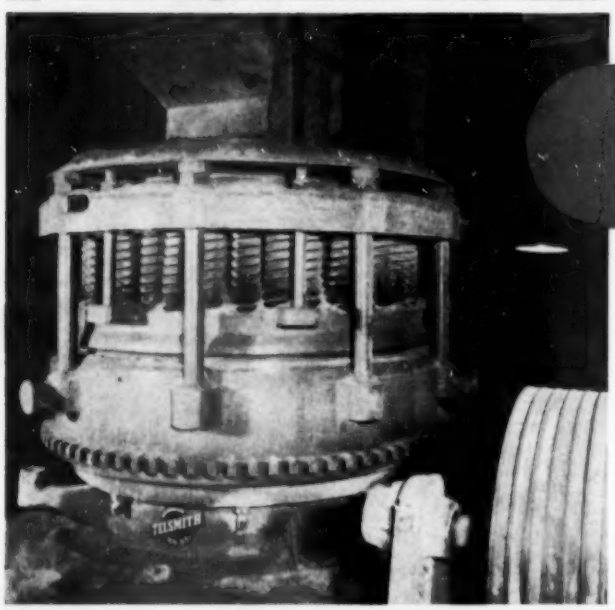
®Gyraspheres in CEMENT MILLS



48-FC Telsmith Fine Crushing Gyrasphere in the British Columbia Portland Cement Company Limited plant at Victoria, B. C.

The British Columbia Portland Cement Company Limited wanted to deliver a finer feed to their cement grinding mills—and thus increase output. To do it, they installed early in 1952, a Telsmith 48 Fine Crushing Gyrasphere to crush cement clinker from 2″ to minus 3/8″.

They are thoroughly satisfied!



48-S Telsmith Standard Gyrasphere in Kosmos Portland Cement Co. plant at Kosmosdale, Kentucky.

The Kosmos Portland Cement Co. has operated their Telsmith 48-S Gyrasphere 24 hours a day since July, 1951—crushing 100 tons per hour of 220 to 275-degree limestone from 4 1/2″ down to 5/8″.

They are thoroughly satisfied!

Send for Bulletin No. 274

Y-13

SMITH ENGINEERING WORKS, 508 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

Cable Address: Sengworks, Milwaukee

51 East 42nd St. New York 17, N. Y. • 211 W. Wacker Drive Chicago 6, Ill. • 713 Commercial Trust Bldg. Philadelphia 2, Pa. • 238 Main Street Cambridge 42, Mass. • Boehck Eqpt. Co. Milwaukee 3, Wis. • The McLean Co., 3525 Lakeside Ave. Cleveland 14, Ohio

Marens Eqpt. Co., 432 Main St., Rochester, Mich. • Clyde Eqpt. Co., Portland 9, Ore., & Seattle 4, Wash. • Mines Eng. & Eqpt. Co., San Francisco 4, Calif.

Rish Eqpt. Co., Charleston 22, & Clarksburg, W. Va.—Roanoke 7, & Richmond 10, Va. • Interstate Equipment Co., Statesville, N. C.

CHEVROLET ADVANCE-DESIGN TRUCKS

Famous for Their Saving Ways

—*and here are 4 Powerful Reasons why!*

EXTRA POWER! How can extra power save you money? The high-compression power (7.1 to 1 ratio) of Chevrolet's Loadmaster engines in heavy-duty trucks means extra power and extra miles from each gallon of gas. Chevrolet's Thriftmaster engine in light- and medium-duty models has long been known for economy of operation.

EXTRA STAMINA! Heavier, stronger construction throughout, more rigid frames! Now, Chevrolet trucks are sturdier and tougher than they have ever been in the past—better able to handle the roughest jobs day after day, months on end. Such outstanding stamina is one more factor—and an important one—in reducing your hauling costs.

MATCHED TO THE JOB, TOO! Every Chevrolet truck is carefully engineered and *factory-matched* to the job it will do. You don't buy too big a truck. You don't buy too small a truck. You get a truck with every unit matched and balanced to the work it will do—and that saves you money, too.

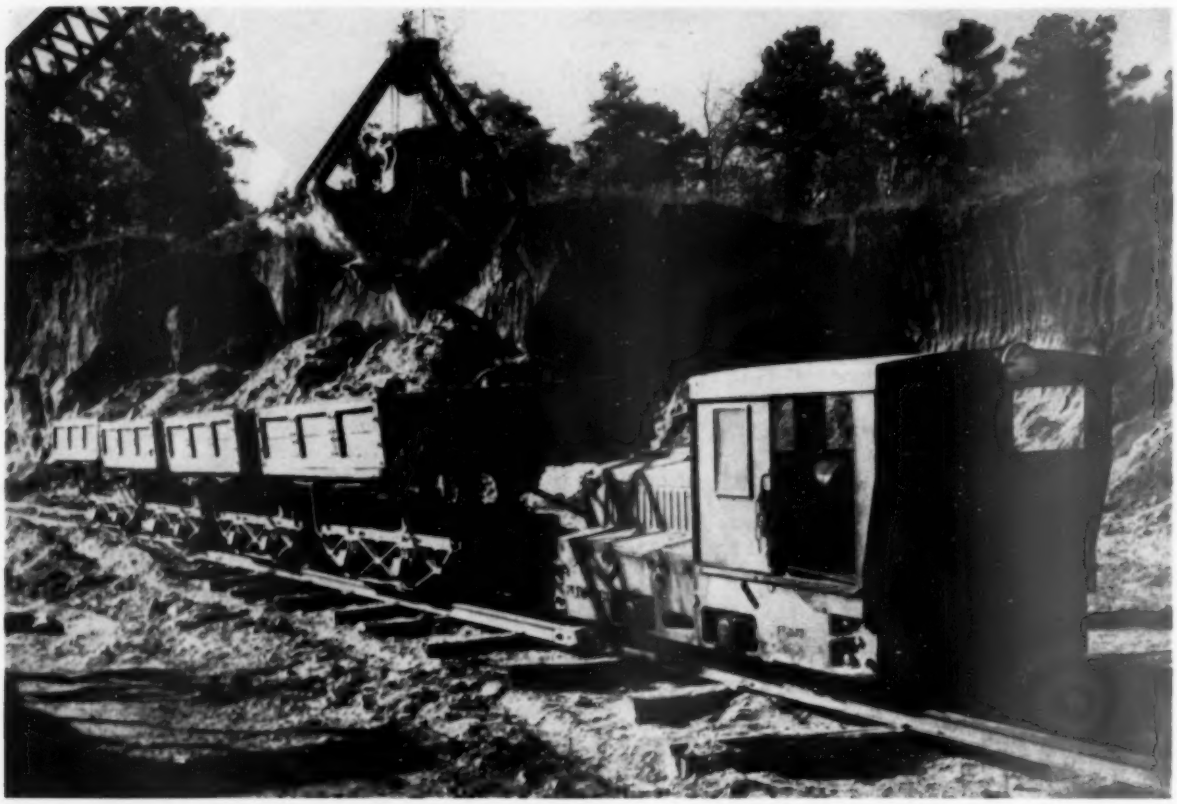
EXTRA OVER-ALL ECONOMY! Many things contribute to lower hauling costs with Chevrolet. But, few are as welcome news to buyers as the fact that Chevrolet trucks list for less than any other truck of comparable size and capacity. See your Chevrolet dealer. Chevrolet Division of General Motors, Detroit 2, Michigan.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—the Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load. **POWER-JET CARBURETOR**—for smooth, quick acceleration response. **DIAPHRAGM SPRING CLUTCH**—for easy-action engagement. **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **HYPOID REAR AXLE**—for dependability and long life. **TORQUE-ACTION BRAKES**—on light-duty and medium-duty models and on front of heavy-duty models. **TWIN-ACTION REAR BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models. **CAB SEAT**—with double deck springs for complete riding comfort. **VENTI-PANES**—for improved cab ventilation. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—for easier handling. **UNIT-DESIGNED BODIES**—for greater load protection. **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.

CHEVROLET

first in demand in value in sales



PLYMOUTH'S

low operating cost saves you money

Plymouth owners who keep careful records are usually surprised when they discover how little it costs to operate and maintain a Plymouth Locomotive. Chief reason for this economy is that Plymouths are built to last longer, work smoother, take little fuel to operate.

One of Plymouth's many satisfied users is the General Reduction Company, Macon, Georgia. Commenting on the performance of their 6-ton Plymouth which is used for hauling overburden, James R. Slocum, Vice-President, says, "Our Plymouth operates over grades up to 3% for an average of 45 hours a week. We are well pleased, and have never had a bit of expense for maintenance in the two years we have had it."

To get similar satisfaction let our experts recommend the Plymouth most suited to your needs. Models range from 3 to 70 tons and have gasoline and Diesel-mechanical, gasoline and Diesel-Torqomotive*, or Diesel-electric Drive. For full information write: PLYMOUTH LOCOMOTIVE WORKS, Dept. A-5, Plymouth, Ohio.

**Torqomotive Drive:* *Plymouth transmission with hydraulic torque-converter.*

PLYMOUTH® LOCOMOTIVES

WITH TORQOMOTIVE DRIVE

ALSO MANUFACTURERS OF F-R-H CERAMIC MACHINERY

P&H STABILITY

makes a big difference!

When you need that extra push, you'll be glad your machine is a P&H. With its low center of gravity, better balance and all-welded construction of rolled alloy steels — you can exert more power at the tooth point with less strain or danger of tipping. That's what gives you the *added work capacity*. You can prove this for yourself as many others have done. Ask to see a P&H on a job near you. Watch it work!

And while you're there, watch the mobility on true tractor-type crawlers. Note how smooth hydraulic control enables the operator to "feel" the load at all times. It's easier on both man and machine. And far easier on maintenance. You'll sell yourself on P&H in a hurry.

P&H POWER SHOVEL AND CRANE DIVISION

HARNISCHFEGER CORPORATION

MILWAUKEE 46, WISCONSIN

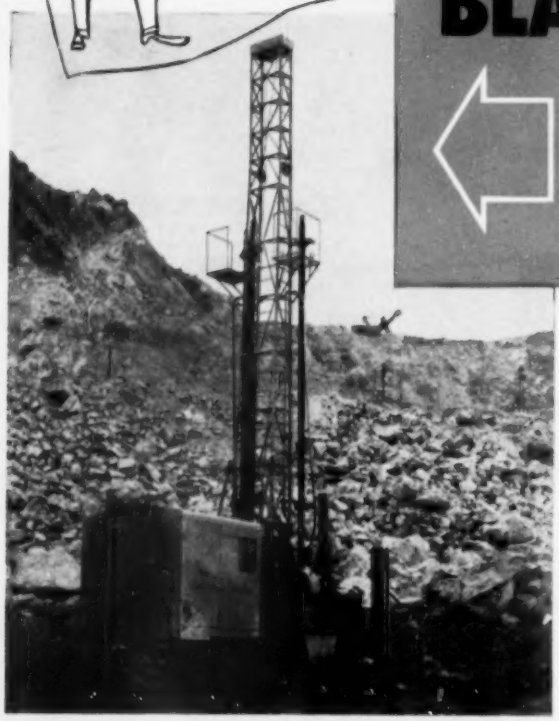
See your P&H Dealer!

Look to P&H for the most modern features in Power Shovel and Truck Crane construction. There's all-welded design, live roller circle, triple-safe boom hoist, hydraulic control, plus a low center of gravity that provides a higher ratio of lifting capacity to gross weight. This means more WORKABILITY . . . BETTER PERFORMANCE . . . GREATER SAFETY. Write for literature on the size you need.

the P&H *Line*

The JOY CHAMPION BLAST HOLE DRILL

CUTS COSTS TO THE BONE!



. . . at the World's Largest Cement Plant

One Joy Heavyweight Champion Blast Hole Drill replaced three churn drills. Blasting preparation was speeded up, labor costs reduced, and lost holes eliminated. Routine production is now 300 ft. of 7⅞" hole per shift in *dense limestone!*

The ability of the machine to "over-drill" to permit over-shooting has also increased quarry output without increasing manpower. The smooth-walled holes have prompted a change from bag powder to modern cartridge loading, for improved fragmentation.

W&D R4634

. . . on one of the World's Largest Canal Jobs

The Joy Heavyweight Champion is used for speed and economy on this large canal job in the "North" country. During the first two months of operation—while crews were being trained—the average drilling rate, including moving and setup time, exceeded 35 feet per hour, in medium hard limestone. Bit life aveaged 1374.4 feet during this training period. ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Galt, Ontario.*

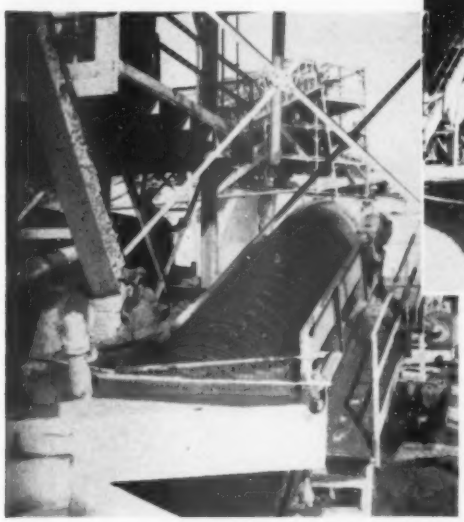
Consult a Joy Engineer

JOY

SINCE 1851—OVER A HUNDRED YEARS OF ENGINEERING LEADERSHIP

Large Western Sand Producer
uses **WEMCO** SAND PREPARATION MACHINES
in six major plants

CENTERVILLE — *Two No. 48 Wemco Sand Preparation Machines, with capacity of 60 TPH each, producing concrete specification sands.*



KERLINGER — *Two No. 48 Wemco Sand Preparation Machines, with capacity of 60 TPH each, used for desliming and dewatering.*

FAIR OAKS — *Two No. 48 Wemco Sand Preparation Machines, each with 75 TPH capacity, used for preliminary washing of minus 1¼" aggregate.*

For producing clean specification sands, Pacific Coast Aggregates, Inc. has installed Wemco Sand Preparation Machines at six of its California producing locations — Centerville, Elliott, Lindsay, Yolo, Kerlinger and Fair Oaks. From its various producing areas, Pacific Coast Aggregates supplies San Francisco, Oakland and other Northern California areas. The company is among the country's largest sand producers.

The Wemco machines used at these plants are efficiently designed for high sand production. Large settling tank and wide weir overflow are features which assure accurate control of separation. Over a wide range of dewatering or desliming conditions, Wemco units provide for maximum or controlled retention of fines with rejection of materials deleterious to production of specification sands.

WEMCO SAND PREPARATION MACHINE

- **Modern design** — *for greater sand production*
- **Large settling tank** — *wide overflow weir*
- **Sharp separation** — *for specification production*
- **Good drainage** — *for dry, clean sands*
- **Minimum moving parts** — *for lowest operating costs*

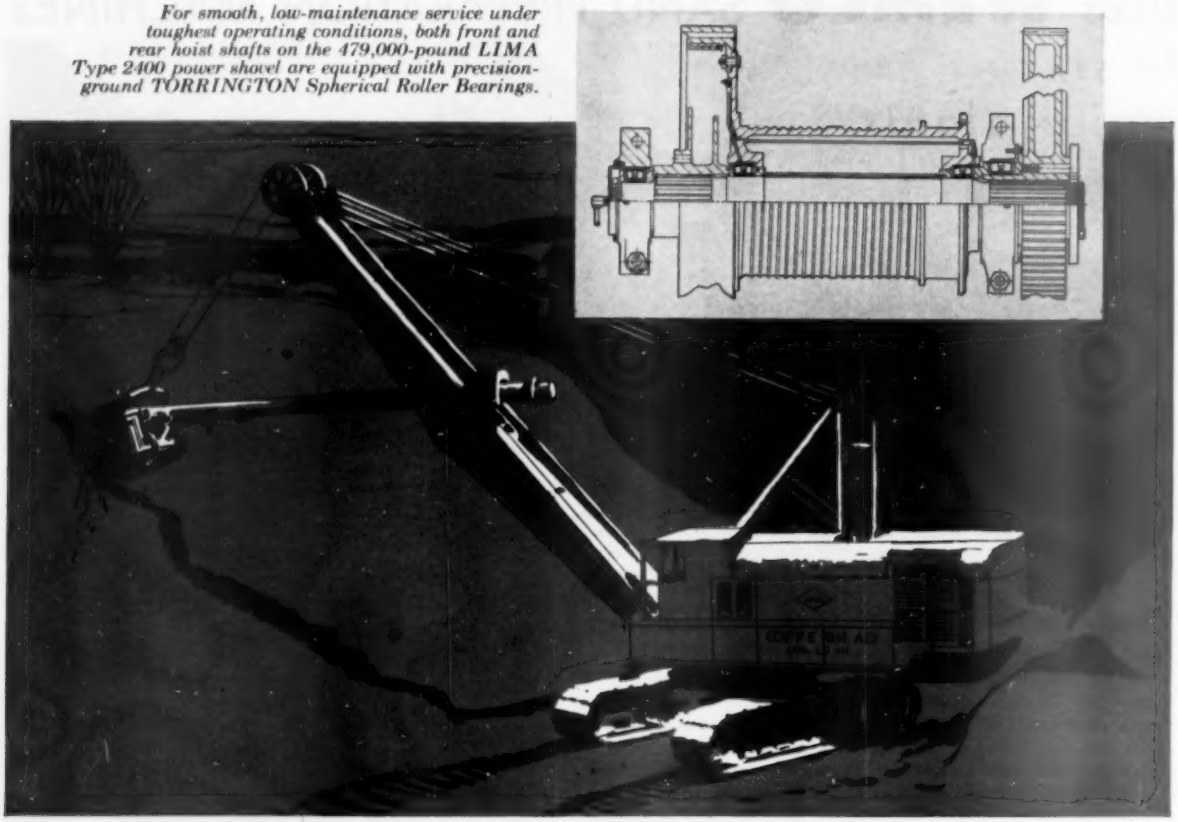
If you're interested in specification sands that sell, write today for further information on the Wemco Sand Preparation Machine.

WEMCO
WESTERN MACHINERY COMPANY
760-766 FOLSOM STREET · SAN FRANCISCO 7, CALIFORNIA

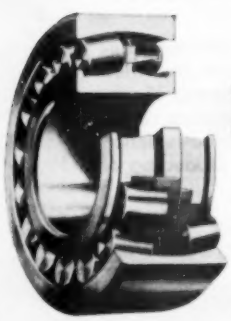
PRINCIPAL OFFICES
San Francisco • Sacramento • Salt Lake City • Spokane • Denver
Pocatello, Idaho • Phoenix • Chicago • Hibbing, Minnesota
New York • Jeffersonville, Indiana • Toronto, Canada

OTHER WEMCO PRODUCTS
Mobil-Mills • HMS Thickeners • HMS Pumps • Cone Separators
Coal Spirals • Sand Pumps • Drum Separators • Dewatering Spirals
Fagergren Laboratory Units • HMS Laboratory Units • Agitators
Hydroseparators • S-H Classifiers • Thickeners • Conditioners
Fagergren & Steffensen Flotation Machines • Densifiers

For smooth, low-maintenance service under toughest operating conditions, both front and rear hoist shafts on the 479,000-pound LIMA Type 2400 power shovel are equipped with precision-ground TORRINGTON Spherical Roller Bearings.



Friction defeated!



Power delivered!

The bite of the bucket into solid earth may cause deflection, but TORRINGTON Spherical Roller Bearings, self-aligning and with high capacity, keep right on rolling. Power is constant and your shovel stays on the job.

These rugged friction fighters are made from the finest of bearing steels, carefully heat treated for maximum strength, toughness and resistance to wear. Both rollers and races are accurately manufactured for geometrical conformity and highest load-bearing capacity at all times. The solid ring, cast-bronze cages are *land-riding*.

TORRINGTON Spherical Roller Bearings cut operating costs in the toughest of earth-moving and rock-processing applications. Prove it to yourself—specify TORRINGTON.

THE TORRINGTON COMPANY
South Bend 21, Ind. Torrington, Conn.

TORRINGTON SPHERICAL ROLLER BEARINGS

Spherical Roller • Tapered Roller • Straight Roller • Needle • Ball • Needle Rollers

Shown at the left is a view of the triple-coil tungsten wire used in many modern fluorescent lamps. (Photo courtesy General Electric Lamps)

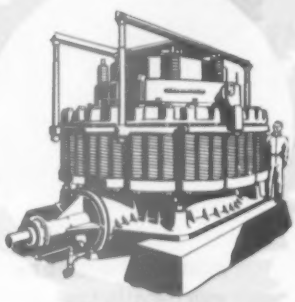
The "ARISTOCRAT OF RARE METALS" might have helped Diogenes . . .

If *TUNGSTEN*, the *"aristocrat of rare metals"*, had been discovered in his time, the Greek Cynic, *Diogenes* might have been able to carry a much brighter lamp to aid in his search for an honest man. For among the many contributions of this metal to modern civilization is the tungsten filament which gives a quality of artificial light otherwise unattainable.

Due to low grade characteristics, and the hard abrasive rock in which tungsten ore is generally found, producers must attain desired particle size for maximum recovery as quickly and economically as possible. It is significant to note the use of SYMONS® Cone Crushers by many of the large tungsten producers . . . who find these crushers particularly suited to tungsten ore reduction because of maximum utilization of crushing surfaces against the highly abrasive material, with minimum wear.

Thus, in tungsten operations . . . *as in all of the great ore and industrial mineral operations the world over* . . . SYMONS Cone Crushers are relied upon to efficiently produce great quantities of finely crushed product at low cost.

NORDBERG MFG. CO., Milwaukee, Wisconsin



SYMONS Cone Crushers . . . *the machines that revolutionized crushing practice* . . . are built in Standard, Short Head, and Intermediate types, with crushing heads from 22 inches to 7 feet in diameter—in capacities from 6 to 900 tons per hour.

SYMONS . . . A REGISTERED NORDBERG TRADEMARK KNOWN THROUGHOUT THE WORLD.

C153

NORDBERG

MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

NEW YORK • SAN FRANCISCO • DULUTH • WASHINGTON • TORONTO
MEXICO, D.F. • LONDON • PARIS • JOHANNESBURG

SYMONS PRIMARY CRUSHERS

GRINDING MILLS

MINE HOISTS

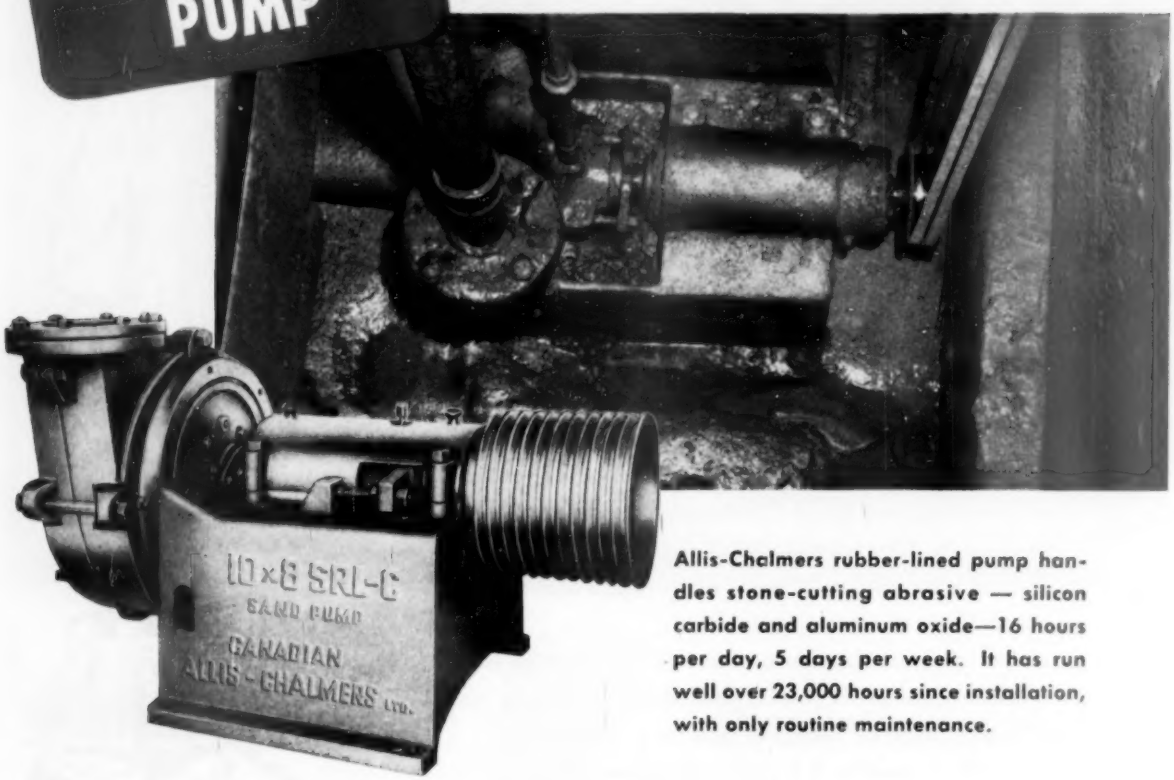
SYMONS VIBRATING BAR GRIZZLIES and SCREENS

DIESEL ENGINES

. . . OVER 23,000 HOURS and still running!

ALLIS-CHALMERS
RUBBER-LINED PUMP

(Best Previous Pump — 1040 Hours)



Allis-Chalmers rubber-lined pump handles stone-cutting abrasive — silicon carbide and aluminum oxide—16 hours per day, 5 days per week. It has run well over 23,000 hours since installation, with only routine maintenance.

PUMPING RECORDS like this are not unusual with the Allis-Chalmers rubber-lined pump. Service life up to 50 times that of the best alloy pumps is common. Pumping costs are greatly reduced because of reduced maintenance and repair costs and also because of fewer production interruptions and less lost production time.

Unique Lining Method

The rubber lining of the Allis-Chalmers SRL rubber-lined pump is bonded to a heavy steel skeleton which is bolted into the casing. This arrangement provides maximum support for the liners but makes them easy to remove when it is found necessary.

Each Installation Specially Engineered

Every pump is individually engineered to provide the best possible performance for the application involved. Special rubber linings of various compounds handle a wide variety of slurries at low cost per gallon pumped.

If you are handling sand, taconite, grinding mill discharge, tailings or any other abrasive slime or slurry and want longer pump life, see your Allis-Chalmers representative. Or write Allis-Chalmers, Milwaukee 1, Wis., and ask for Bulletin 08B7311.

A-3953

ALLIS-CHALMERS

"Our Dodge trucks are always ready for more work!"

Why new Dodge *"Job-Rated"* trucks help heavy haulers haul down bigger profits!

New stepped-up power!

New Dodge trucks move heavy loads onto and over the highway in jig time. Little wonder, too, with horsepower as high as 171 gross; PLUS higher-than-ever compression ratios. Optional twin carburetion and exhaust systems also gives ample power for hauling extra-heavy loads. And because they are *"Job-Rated"*, Dodge trucks are good for years of rugged toil . . . years of thrifty service.

Real rock-ribbed value

On top of regular Dodge extra values, imagine how these new features bolster your truck investment: reinforced cab construction, new "dual-primary"-type brakes that anchor tons of payload on steep inclines, increased engine cooling capacities. It won't cost a dime to drop in and chat with your friendly Dodge dealer. Have him explain how Dodge *"Job-Rated"* trucks fit into your hauling picture.

. . . says **Glenn M. Sayers,** *General Foreman, Whiteside County Highway Dept., Morrison, Illinois*

"Our Dodge trucks do a nice job for us.

"We have four 2½-ton dumps and use them regularly for all sorts of rugged work. They haul road gravel, limestone, black top matter, quarry rock . . . and they plow snow as well!

"We are well satisfied with the good, dependable performance of Dodge. Our drivers also tell us that the dependability of Dodge is tops.

"Our Dodge trucks are always ready for more work!"

DODGE
"Job-Rated" TRUCKS

PRECO *Back-Rippers*

RIP THIS TOUGH SHALE...

FOR FAST DOZING!

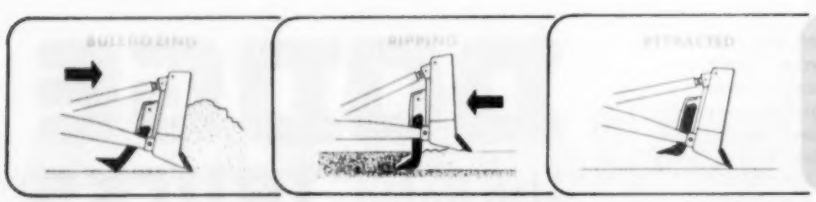
This tough layer of shale three to eighteen inches thick, in the limestone mine of the Louisville Crushed Stone Co., has been licked by Preco Back-Rippers.

Formerly it was a long, slow process for this Kentucky firm to break it up with drills, then shovel it out of the way to reach the limestone.

With Preco Back-Rippers attached to the bulldozer on a Caterpillar D8 Tractor they now rip out the shale as the tractor backs up... then doze it into a pile on the forward trip.

Wherever bulldozing is tough—in ledge rock, hardpan, cemented gravel, decomposed granite, slate or flint rock—Preco Back-Rippers break it out while the tractor is dead-heading on the back-up trip... enabling the operator to make a full load on each forward pass.

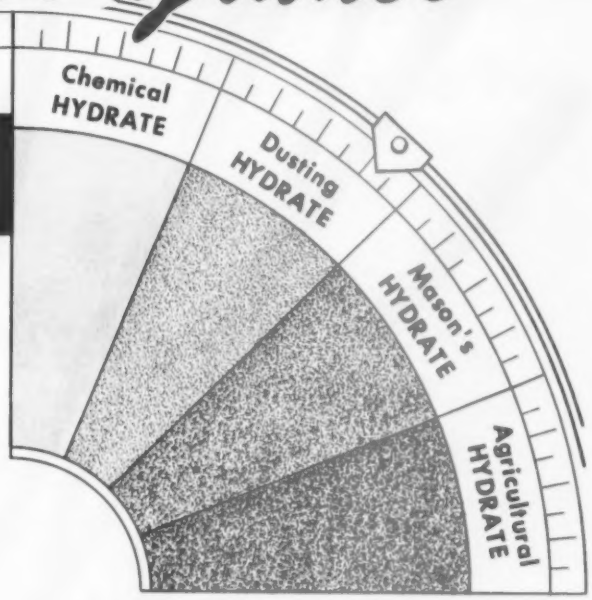
For complete information ask your "Caterpillar" dealer.



PRECO
INCORPORATED
6200 E. SLAUSON AVE., LOS ANGELES 22
CABLE ADDRESS: PRELA

Preco Back-Rippers are available for "Caterpillar" models including straight blade, angling blade and U-blade bulldozers.

Produce ALL Grades of HYDRATED LIME with ONE UNIT

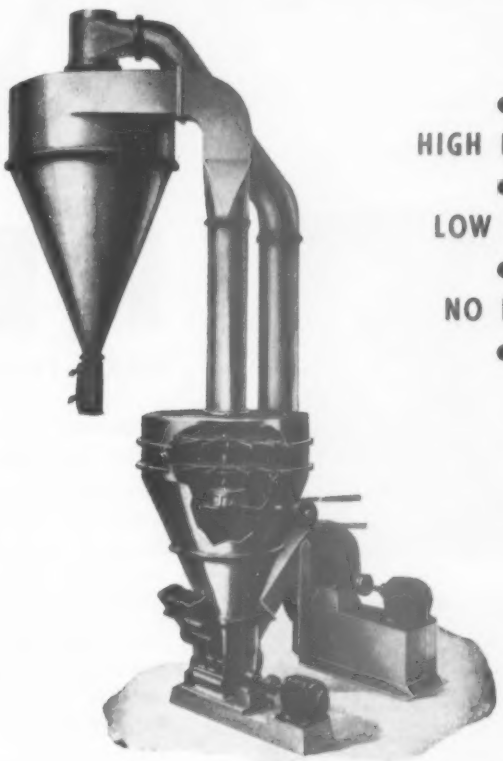


THE Raymond Automatic Pulverizer is the standard machine throughout the industry for disintegrating and classifying various grades of Hydrated Lime. It is an efficient and compact unit that provides a modern dust-free system for making superior lime products.

This one machine handles the complete operation of disintegrating, classifying and conveying the hydrated lime, as well as automatically rejecting impurities.

All grades of lime are produced by this unit, ranging from superfine chemical and spray limes to mason's and agricultural hydrate. The change from one grade to another is made by one simple adjustment.

Whizzer air separation maintains consistently uniform hydrate, and greatly increases capacity, particularly in the finer grades.



- HIGH PURITY
- LOW COST
- NO DUST

RAYMOND
AUTOMATIC PULVERIZERS
CATALOG No. 60

For further details write for Raymond Catalog No. 60

COMBUSTION ENGINEERING, INC.

Raymond PULVERIZER DIVISION

Sales Offices in Principal Cities

1307 North Branch Street
Chicago 22, Illinois

REXARC

HARD-FACING AND MANGANESE ELECTRODES

Equipment idle or slowed down because of worn-out, broken parts? Down-time eating into profits? Take a tip from Rexarc!

Cost-conscious operators are applying Rexarc at points of wear and impact on all types of earth moving, crushing and abrasive material handling equipment. They're saving thousands of dollars each year in new parts, cutting down-time to a minimum and keeping equipment working longer at bigger profits.

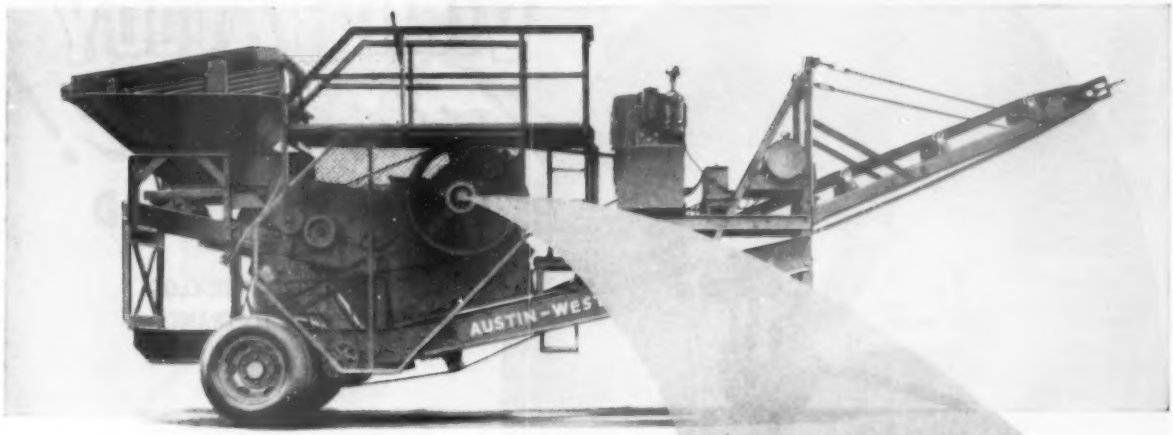
Your weldors will like Rexarc's fast build-up and ease of application. And, you'll like its long-wearing quality and economy, too. Because of an all-metallic coating, you get a maximum of deposit. This means Rexarc costs less, regardless of price per pound. Investigate the possibilities today!

Within reach of your plant, repair shop or construction job, there's a Rexarc Distributor ready to serve you. Ask him to demonstrate Rexarc's superior running qualities. He will be glad to help you with your build-up and hard-facing problems, too. If you would like his name, write, wire or call

THE SIGHT FEED GENERATOR COMPANY

WEST ALEXANDRIA, OHIO, U. S. A.

GET *EXTRA* PRODUCTION with an AUSTIN-WESTERN "61" Crushing & Screening Plant



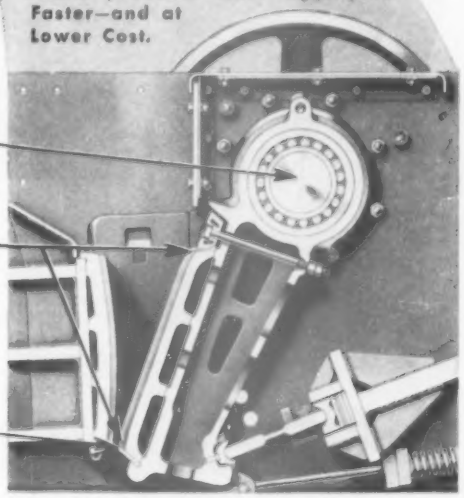
Here is a portable single pass crushing and screening plant developed for use by contractors, counties or townships. Its high production, extreme simplicity and low operating costs, have established a new high standard of operation for a plant of this type. Here are a few of the money making advantages to be found in the AUSTIN-WESTERN "61" plant:

1. High capacity 1024 Jaw Crusher.
2. 2' x 4' single deck, four bearing type scalping screen that by-passes all fines around the crusher.
3. Large, plant mounted reciprocating type feeder.
4. 24" x 26' delivery conveyor.
5. Anti-friction bearings throughout.
6. V-belts or enclosed gears on all drives.
7. Easily transported over any highway.

See an AUSTIN-WESTERN "61" plant in operation and make your own comparison as to initial cost, performance and capacity. For further facts contact your nearby AUSTIN-WESTERN distributor.

THE HEART OF THE PLANT

The 1024 Jaw Crusher with its Extra Speed, Long Jaws and Long Stroke produces more aggregate Faster—and at Lower Cost.



There are Austin-Western crushing plants for any requirement you might have . . . small portable units with single crusher and screen, multiple portable units, or stationary crushing and washing plants. We have just the plant to fit your requirements . . . each basically designed and engineered to give you maximum production at minimum cost.

Note: Austin-Western crushers are now being engineered and manufactured in Lima, Ohio, enabling us to maintain steady, top-quality production of crushers.

Austin-Western
CRUSHING, SCREENING and WASHING EQUIPMENT

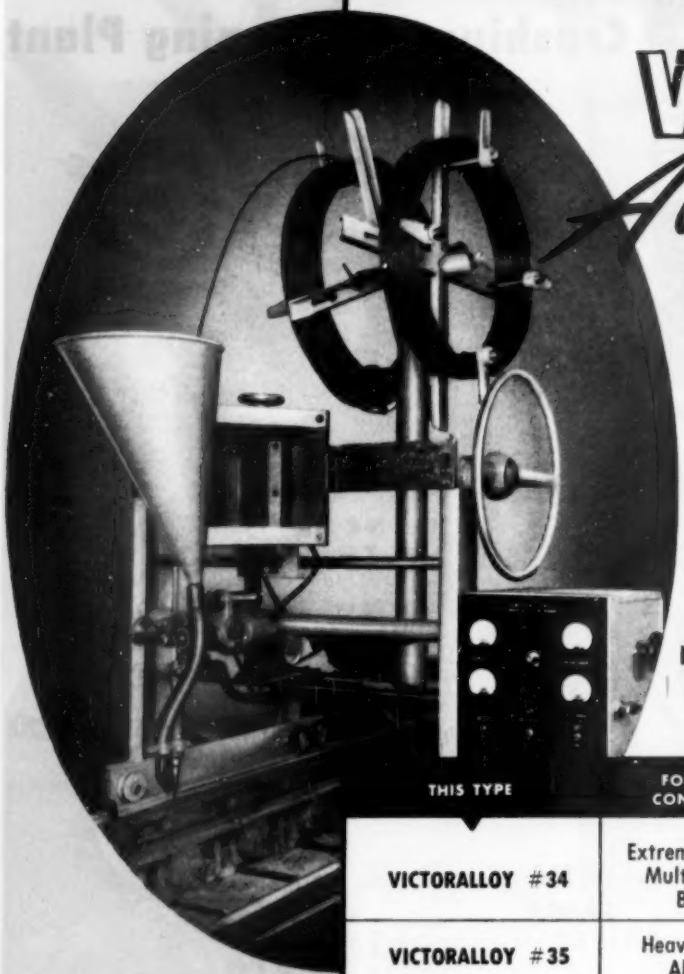
BALDWIN-LIMA-HAMILTON CORPORATION
Construction Equipment Division
LIMA, OHIO, U.S.A.

Construction Equipment Division

Victor presents...

VICTORALLOY *Automatic!*

HARD-FACING ROD



- UNIFORM SIZE, SUPER-CLOSE DIMENSIONAL TOLERANCE
- SUITABLE FOR ALL AUTOMATIC HEADS
- "HANDI-PACKED" IN 100 LB., WATERPROOF-WRAPPED COILS
- FIVE DIFFERENT ALLOYS . . . A TYPE TO MEET *YOUR* REQUIREMENTS EXACTLY!

THIS TYPE	FOR THESE CONDITIONS	ON THIS KIND OF EQUIPMENT
VICTORALLOY #34	Extreme Abrasion, Multiple Layer Buildup	Tractor Rails, Crane Wheels, General Buildup.
VICTORALLOY #35	Heavy Impact, Abrasion	Tractor Rollers, Idlers, Mine Car Wheels, Sheave Wheels.
VICTORALLOY #170	Abrasion, Medium Impact	Crusher Rolls, Crushers, Gyratory Crushers.
VICTORALLOY #300	Abrasion, Light Impact	Mill Guides, Crushers, Dredge Bushings.
VICTORTUBE #60	Extreme Abrasion	Tool Joints, Grader Blades, Scraper Blades, Augers.

For better welding equipment and supplies, look for VICTOR dealer sign. New dealer inquiries invited.

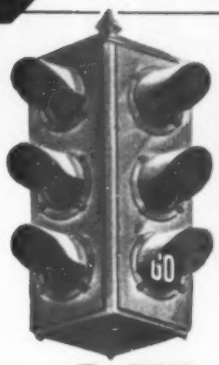
VICTOR for welding

Victor Hard Facing Alloys are also available for manual arc welding, AC or DC, and for gas welding.

VICTOR EQUIPMENT COMPANY H3

3821 Santa Fe Ave. LOS ANGELES 58 | 844 Folsom Street SAN FRANCISCO 7 | 1312 W. Lake St. CHICAGO 7

STOP WASTING MONEY BY THE TRUCKLOAD



Go White!

YOU NEED the most efficient kind of trucks for today's schedules . . . today's operating costs . . . today's work conditions.

That's why you see so many Whites these days in excavating service and dump operations.

Tailored to the exact needs of your work, Whites have the power and the rugged reliability to get more work done . . . in less time . . . at lower cost.

Find out how Whites save money in *your* kind of business.

THE WHITE MOTOR COMPANY • *Cleveland 1, Ohio*

For more than 50 years the greatest name in trucks

White

Check these White advantages . . .

- √ WIDE RANGE of models to meet every excavating operation—4 and 6-wheel trucks and tractors for end or side dump.
- √ SINGLE drive axle units with single or double reduction or two-speed axles.
- √ TANDEM drive units with double reduction axles.
- √ WHEELBASES as required. Heavy duty springs, front shock absorbers, rock-lug tires and other special units available as required.
- √ ENGINES—gasoline or diesel-powered.
- √ TRANSMISSIONS—various transmissions and auxiliary transmissions to meet local operating conditions.

SMIDTH

MACHINERY

FOR

CEMENT · LIME · ORE

Smidth Machinery has been supplied to over

70 COUNTRIES OF THE WORLD

INCLUDING

1000
Rotary Kilns

5000
Grinding Mills

In addition to rotary kilns and grinding mills, Smidth equipment includes a complete line of machinery such as coolers, agitators, washmills, pumps, conveyors, packers, separators, etc., with accessories, for use in Cement, Lime and Ore plants.

For Smidth Machinery apply to:

F. L. Smidth & Co., A/S
Vestergade 33,
Copenhagen K, Denmark

F. L. Smidth & Co.
11 West 42nd Street
New York 36, N. Y.

F. L. Smidth & Co., Ltd.,
105, Piccadilly,
London, W. 1, England

F. L. Smidth & Cie France
80 Rue Taitbout
Paris (9e) France

F. L. Smidth & Co. of Canada, Ltd.
11 West 42nd Street
New York 36, N. Y.

F. L. Smidth & Co. (Bombay) Ltd.
42 Queen's Road
Bombay, India

"WE HEAR..."

May, 1953

Construction contract awards in the 37 states east of the Rockies for the first quarter of 1953 totaled $3,444,696,000, an increase of 11 percent over the first quarter of 1952, according to an F. W. Dodge Corp. report. Residential awards of $1,483,804,000 were up 12 percent; non-residential awards of $1,230,410,000 were up 10 percent; and heavy engineering (public works and utilities) awards of $730,482,000 showed an 11 percent gain. Total awards for the month of March amounted to $1,347,518,000, which was a 32 percent increase over February, and a 2 percent increase over March, 1952.

* * * * * * * * * *

A Denver, Colo., ready-mixed concrete producer found a new outlet for his product when he recently supplied concrete for Denver's first "concrete lawn," which he described as "the oddest job we ever did." The "lawn" consists of a 4-in. thick, green-dyed, wavy-textured, concrete slab, covering 11,000 sq. ft. The owner of the property and his wife, who are both traveling salesmen, feel the concrete lawn will pay for itself in seven years in savings gained on water, labor, grass seed and fertilizer,as well as keep the yard from filling with weeds while they are traveling.

* * * * * * * * * *

A synthetic soil conditioner, which is said to control rain and wind erosion on bare earth of construction sites and other places, is being produced by a Missouri chemical company. Called "Bondite," the product is said to stabilize soil surface until grass can grow and keep the soil from blowing or washing away. According to the manufacturer, a state highway department has developed a mobile spray unit that applies the soil stabilizer, seed and fertilizer all in one operation.

* * * * * * * * * *

According to a report in a recent issue of "Public Roads," 14 percent of truck-tractors, semi-trailers and truck-trailers, operating on rural highways in 1951, were illegally overloaded.

* * * * * * * * * *

The skull of a prehistoric bison was recently unearthed in a gypsum quarry at Loveland, Colo., 22½ ft. below the ground surface. An archaeological society representative reported the skull to be as large or larger than those of any fossils discovered previously. Some other bones, including several bison teeth, were also found nearby. After restoration work, the fossil will be placed on display at the local museum.

* * * * * * * * * *

Florida builders and contractors reportedly purchased 6,680,151 bbl. of portland cement in 1952, excluding importations of cement from off-shore possessions and from foreign countries. This was a 14 percent increase over 1951 consumption, compared with a 4 percent national increase. Compared with 1949 figures, Florida consumption has increased 49 percent, while national consumption has shown a 21 percent increase. The increased cement consumption reflects the large building expansion being experienced in Florida.

* * * * * * * * * *

A former stone-quarry site in Kansas City, Mo., is being rehabilitated into a 6-acre natural habitat, as a part of Swope Park zoo. The area is being graded and a lake, approximately 150 x 50 ft. is being prepared. One of the principal aspects of the work is the construction of an 8-ft. concrete wall around the veldt to keep the animals in the open area. A walk will surround the veldt so visitors will be able to view the animals closely and safely. An 87- x 36-ft. concrete-block building is also being built to house the animals and birds during bad weather. Landscaping of the area is being planned to achieve the effect of a native African region.

WE HEAR

Construction costs, after relative stability for six months, started an upward trend with an 0.04 percent increase in April, following pricing de-control of cement and other building materials, as reported by Engineering News-Record. The construction cost index for April, 1953, was listed as 589.53 (1913 equalling 100), a 6.4 percent increase over April, 1952. The building cost index for April, 1953, was listed as 426.45 (also a 1913 base), which was a 4.5 percent gain over April, 1952. Cement price increases were reported in 14 of the 20 cities covered, with the hikes ranging from 15 to 20 cents per bbl. Price increases were also reported for ready-mixed concrete, mortar, sand, gravel and lumber. And, on the labor front, construction unions in several cities are reportedly negotiating new wage agreements, with many asking for raises of 25 cents per hr. and more.

* * * * * * * * * *

A total of 7780 new freight cars were delivered by manufacturers for use on U.S. railroads in February, 1953, as reported by Missouri Pacific Lines. Of these, 3035 were box cars; 2746 were hopper cars; 753 were gondolas; 410 were tank cars and the remaining 836 were refrigerator, flat, hopper and caboose cars.

* * * * * * * * * *

Vermiculite, which is finding an increasing number of uses, is now being used by a South Carolina manufacturer of automatic household irons. Use of the material inside the cylinder of the iron keeps the heat on the outside surface and prevents it from leaking inward where it does no good.

* * * * * * * * * *

A county zoning board order, halting expansion of an Ohio quarry operation, was recently upheld in court by the Common Pleas judge, who ruled that since the land was not actually in use as a quarry at the time the zoning regulation went into effect in 1948, a "non-conforming use" permit would not be valid. The owner of the property in question had applied for a permit to extend quarrying operations to a 16.8 acre tract, adjacent to the present quarry site. The case had been pending since the zoning board denied the permit in May, 1950.

* * * * * * * * * *

A bill has been introduced into the Florida State legislature which, if passed, would require phosphate producers to secure a license and pay an additional tax of $0.50 per ton on minerals mined in the state.

* * * * * * * * * *

Another theft of dynamite caps has been reported by a quarry operator. A carton of 1000 dynamite caps, along with a dynamite testing device and other tools, were stolen from a midwestern quarry storeroom.

* * * * * * * * * *

An extensive study of "road building" is to be conducted by a House subcommittee. Items to be considered are: Whether financing the highway system should be left to the states in return for the federal government's releasing of gas taxes to them; maximum weight limits for trucks; and how extensively toll roads should be allowed to mushroom.

* * * * * * * * * *

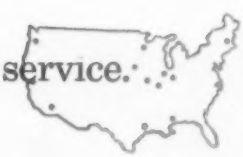
Heavy construction awards, nationally, totaled $4,921,739,000 for the first 16 weeks of 1953, an all-time high, as reported by Engineering News-Record. This was a 28 percent increase over construction awards of $3,837,339,000 for the corresponding 1952 period.

* * * * * * * * * *

U.S. capital investment and technical assistance are being sought for the establishment in India of a new industry to manufacture rock-wool insulation. Studies concerning the feasibility of such an industry were conducted by the Shri Ram Institute for Industrial Research in Delhi, which also developed a manufacturing process which would utilize such materials as blast-furnace slag, sugar factory filter press muds and calciferous wastes of chemical industries. For the past three years, the institute has been producing rock wool in a pilot plant of its own design and construction, supplying the product to government and private consumers to test the market. The institute reportedly would now like to turn the project over to a private manufacturer at a nominal royalty.

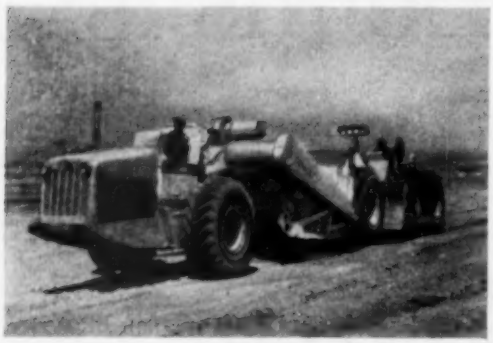
THE EDITORS

Here's Why Bemis is Your Best Multiwall Paper Bag Source...

Since 1858, Bemis has SPECIALIZED in making bags. Bemis buys immense quantities of kraft paper and so can get the "pick of the crop." Bemis laboratories are the watch dogs of paper quality. Bemis engineers work constantly on new and better bags for diversified products. Bemis' twelve multiwall plants are strategically located to give unexcelled service. 

Bemis

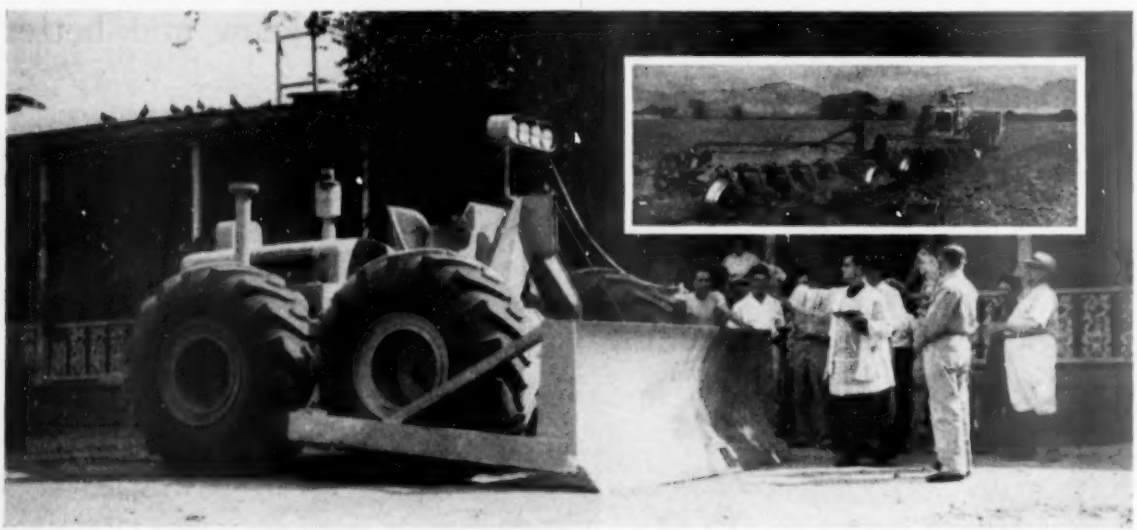
LeTourneau pictures of the month . . .



DIAMOND MINER — Near Kasai, Belgian Congo, 9 C Tournapulls and 5 Tournatractors are stripping 7,850,000 cu yds of overburden to uncover industrial diamond deposits. Push-loaded by a 186 hp Tournatractor, each Tournapull removes 6 to 7½ loads (59 to 73 pay yds) of clayey sand hourly on a 1-mile cycle.

5 JOBS DAILY — "Tournatractor does the work of 2 crawlers," reports Plant Supt of an Arkansas bauxite mine. Speedy rig cleans around two 2½-yd shovels . . . dozes ore into 8 grizzlies . . . maintains rock stockpile. Rig also pulls "gyp" wagon to dump . . . spreads waste material — does all these jobs in a 12-hr shift.

40% LOWER COSTS — No, these rocks weren't "frozen" into the Tournarocker. High-speed photography makes them look like it, but actually dump took only 5 to 10 seconds on this W. Va. rock job. Owner C. E. Wetherall also reported his D Tournarockers gave 40% lower hauling costs than trucks. Output for his two 9-ton Tournarockers on typical 1400-ft cycles: 144 pay yds of shovel-loaded rock hourly.

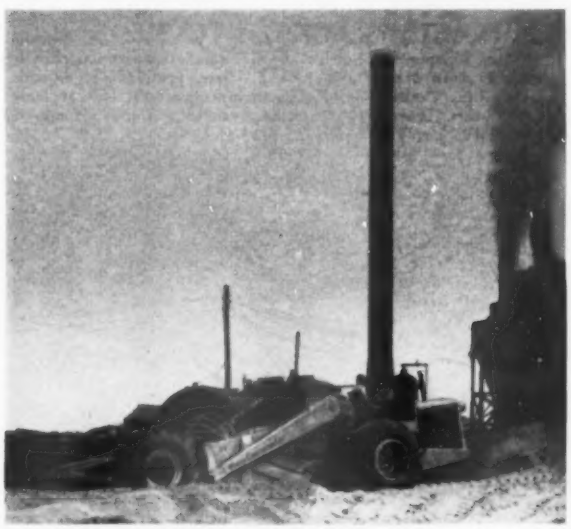


DOUBLE BLESSING — In ceremony, traditional all over South America, padre blesses new Tournatractor. Hacienda Pata-Poo, Peru owner of the unit, has received a blessing, too. Their 19 mph Tournatractor, pulling 2 gang disks, deep-plows 2½ acres hourly — twice crawler output. Tournatractor also pulls 24-in. ripper for sub-soiling. This tool digs 20 in. deep into hard clay, brings up sub-surface water unobtainable with other methods. Explains Plantation Manager de Miguel, "The extra water makes our cane grow healthier, weigh more, and increases sugar content — thus producing more sugar and more profits."

(Advertisement)

performance reports from around the world

BAGDAD HAULER — This 40-ton Tournarocker is one of Bagdad Copper Corp's haul units. The company, which mines copper at Bagdad, Ariz, also owns a 50-ton Tournarocker. Cycle of 4500 ft takes the 40-ton 'Rockers 11.2 min, despite 650 ft of 10% adverse grade and narrow haul roads. Cycle time includes 2 min to load from a 4-yd shovel, and ½ min to spot and dump. Disc-type 4-wheel air brakes let operator haul in 3rd gear along the narrow benches with complete confidence and safety.



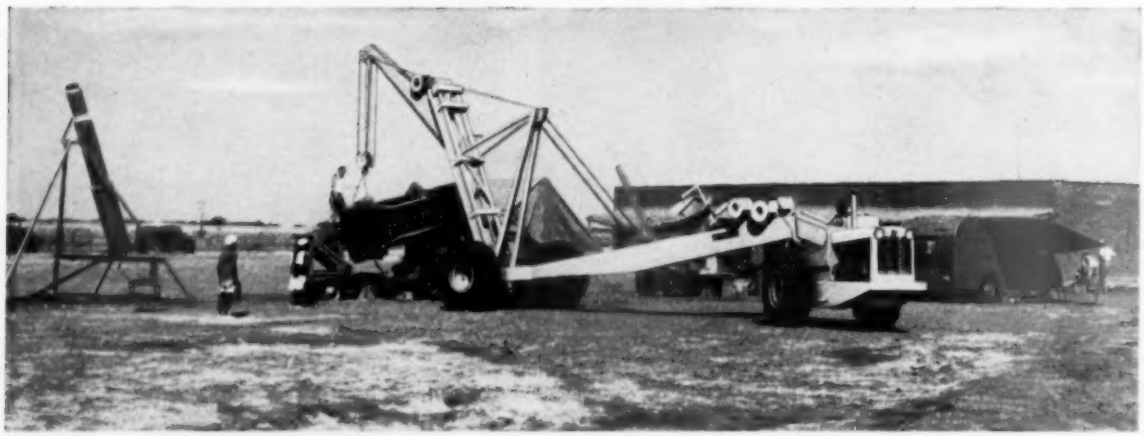
100 YDS PER HR WINS JOB — On competitive demonstration at a Greenville (N.C.) asphalt plant, this D Tournapull stockpiled 20 loads of sand hourly. Each of two 91 hp crawlers, working same 450 ft haul, brought in only 6 loads hourly. All rigs self-loaded 5 bank yds per load. Based on results, Company President A. J. White bought the Tournapull.

22% MORE COAL — Stockpiling coal for a power station in Rhode Island, Tournatractor dozed 16,850 cu ft (420 tons) of coal in 2 hrs . . . outproduced a crawler-tractor working under identical conditions by 77 tons (or 22%). Coal was moved 190 ft down a gradual slope, then over a steep 25-ft bank.

Cont'd on next page

(Advertisement)

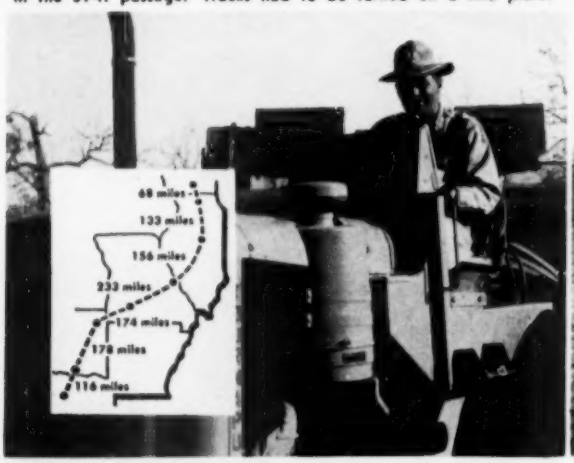
LeTourneau pictures of the month (cont'd) . . .



336 HR JOB IN 12 HRS—When a last-minute telescope breakdown threatened success of the US Navy and National Geographic Society's Solar Eclipse expedition to Khartoum, the Anglo-Egyptian Sudan Government came to the rescue. Its versatile 15-ton Tournacrane carefully hoisted and positioned the delicate 2-ton dish-assembly. The job, which would have taken about 336 man-hrs if done by hand, took only 12 man-hrs with the Tournacrane. Instead of missing the Eclipse they had traveled 7000 miles to see, astronomers not only saw the entire event, but had plenty of time to test and re-adjust settings.

"TOUGHEST TUNNEL"—Halfway into a 3226-ft tunnel for B & O RR, Chicago Contractors Bates & Rogers struck an abandoned coal mine that made their routine job "one of the toughest RR tunnels ever built." Ten-yd Tournarockers, with 12¾-ft turn radius, were only haulers that could turn non-stop in the 31-ft passage. Trucks had to be turned on a skid plate.

OUTLASTS TRACKS, 4 TO 1 — This material may look like powder, but it's abrasive sand. It wears out crawler tracks in 4 to 6 months, yet C. E. Ulery, president of Asphalt Paving Inc., Jacksonville, Fla., estimates tires will last at least 2 to 3 years. Despite 100 lbs rolling resistance, Tournapull moved 9 loads (55 pay yds) hourly on 2700 ft cycles.



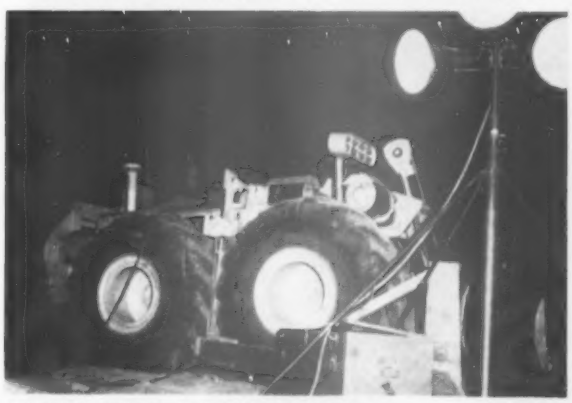
1058 MI FOR $60 — In a move which dramatically illustrated the roadability of a D Tournapull, Bill Kastner traveled 1058 miles from his home in Madison, Wis, to Arlington, Texas. It was D Tournapull's longest solo highway trip of the year. He started at 2 pm Jan 3 at Madison. By 6 pm that day, he had arrived at Rockford, Ill . . . 68 mi in 4 hrs. The second day he ran into a blizzard and made only 133 mi to Bloomington, Ill. His next stop, on Jan 5, was St. Louis, 156 mi further. On Jan 6 he drove 233 mi to Springfield, Mo . . . Jan 7, 174 mi to Pryor, Okla . . . Jan 8, 178 mi to Durant, Okla. At 1:30 pm Jan 9, Kastner arrived in Arlington, Tex. In 6 days, he had driven 1,058 mi (all by daylight) . . . used 180 gals of fuel . . . average, 5.9 mi per gal. Total expenditure for fuel, lodging and food: $59.98. Saving over rail freight: $450.

(Advertisement)

performance reports from around the world

8 JOBS FOR JOHNS-MANVILLE — Even though the temperature often reaches 50° below zero, Canadian Johns-Manville works their Tournatractor 24 hrs a day, 6 days a week at their asbestos pit near Matheson, Ontario. One winter month, rig put 535 hrs in on 8 scattered jobs (other hrs went for job-to-job travel, lubrication, etc.). Of total time, unit spent 238 hrs dozing ore to crusher, cleaning around 4 shovels, and maintaining ore stockpile. Another 87 hrs went into tailings-dump maintenance. 62 hrs into waste-dump maintenance. Tournatractor worked 43 hrs towing compressors, wagon-drills, and other mine equipment. For 62 hrs, it plowed snow — in one typical 6¾-hr period, traveling 30 mi and opening 26 mi of road. For 43 hrs, it did such odd jobs as clearing rock and clay overburden, and helping shovels up steep grades. Its mechanical efficiency: 95%.

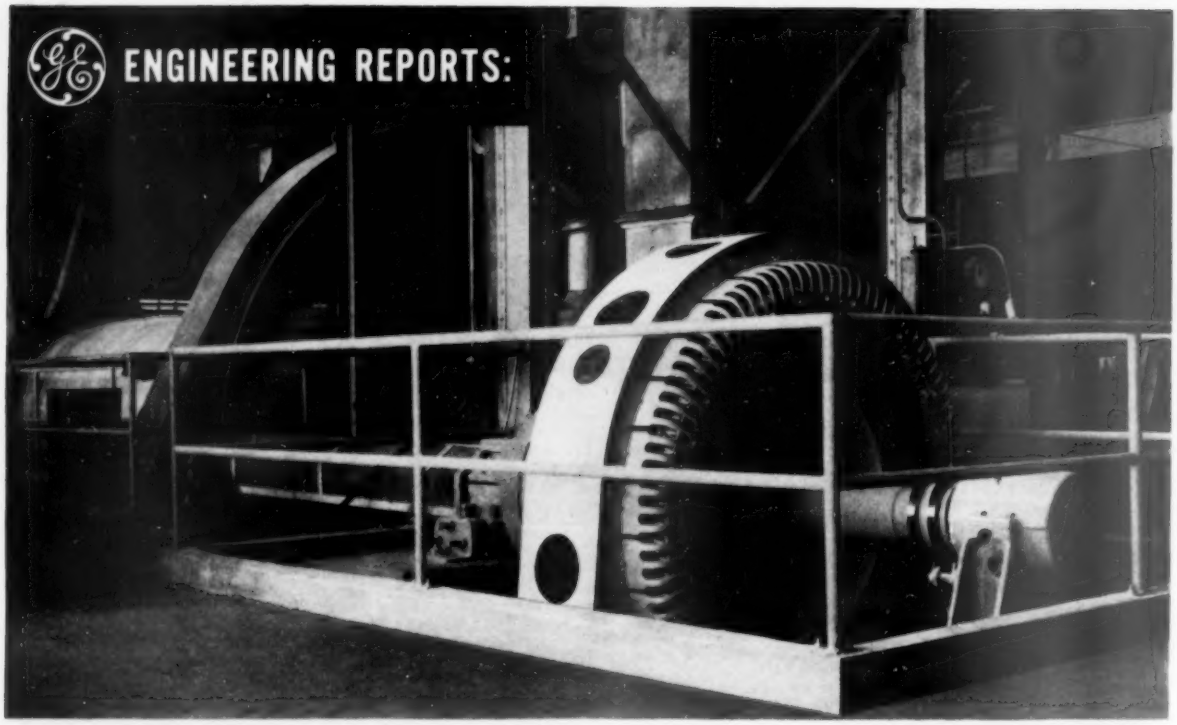
GOOD AS 4 MACHINES — "My D Roadster has replaced 3 trucks and one ¾-yard shovel on this job, and eliminated the wages of 3 hired men," says Sam Coffman of the Bowie Sand and Gravel Co. in Texas. His "D" strips the pit . . . selectively self-loads sand and gravel . . . stockpiles materials.



EMERGENCY GENERATOR — Another use for Tournatractor — as a portable generator for operating lights and power tools. For further information on any machine shown here, write to R. G. LeTOURNEAU, INC., Peoria, Ill.

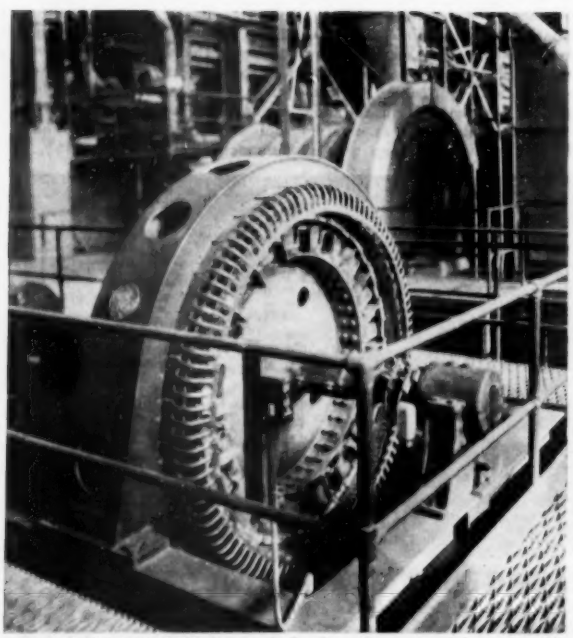
Tournapull, Tournarocker, Tournacrane, Carryall—Trademark Reg. U. S. Pat. Off. Tournatractor—Trademark Plc. 397-M

(Advertisement)



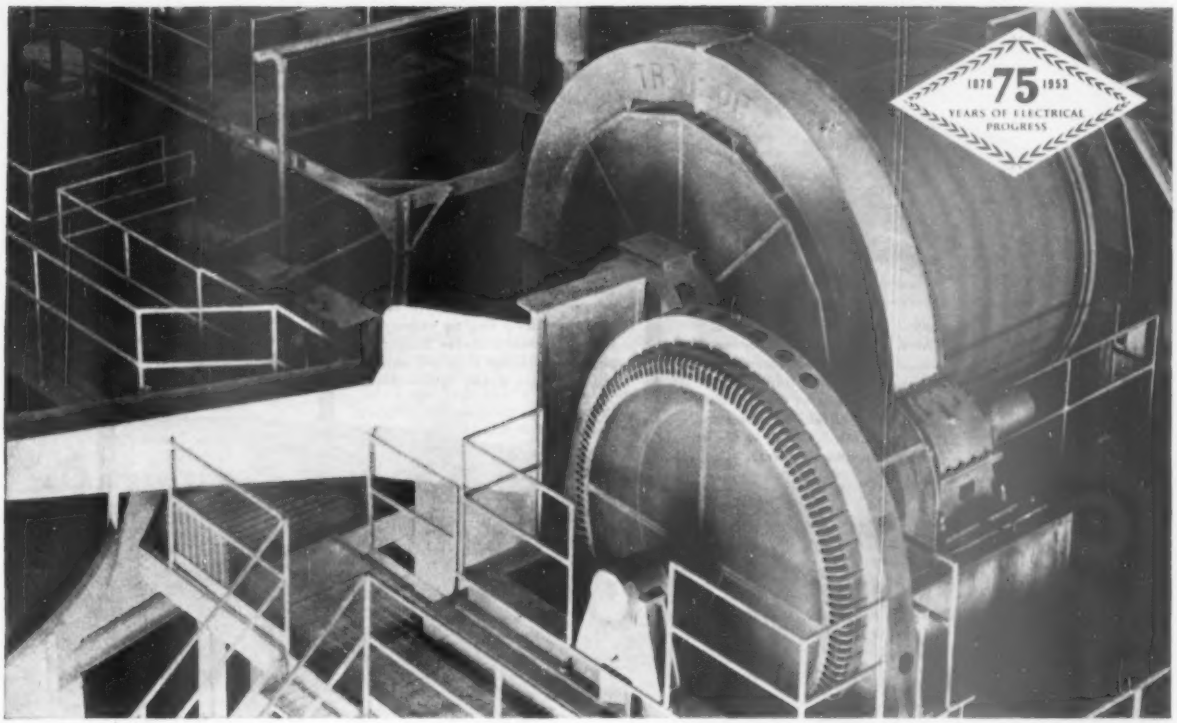
HIGH OPERATING EFFICIENCY is inherent in G-E low-speed high-voltage synchronous motor drives for large pulverizers. In a California cement plant, eight of these General Electric synchronous motors are used to drive the finishing mills.

High-voltage drives for large



LESS MAINTENANCE is needed when fewer and larger mills are driven by high-voltage synchronous motors. An example is this G-E 500-hp, 2300-volt unit driving a ball mill.

SPACE-SAVING General Electric limitamp high-voltage motor control panels for synchronous motors provide adequate short circuit protection with high-IC current-limiting fuses.



IMPROVED POWER FACTOR that cuts plant power bills is another advantage of General Electric synchronous motors. This 500-hp, 180-rpm, 4160-volt unit in a Colorado cement plant drives a primary wet ball mill that is used in raw grinding.

pulverizers boost cement output

G-E APPLICATION ENGINEERS, experienced in cement plant problems, plan and integrate electrical systems to meet your plant's specific needs.

As part of an electrical modernization plan, they also reduce maintenance, cut plant power distribution costs

One way to cut unit costs per barrel of cement today is through greater continuity of production—using large, high-output pulverizers driven by efficient, high-voltage 2300- or 4160-volt motors and control. Many cement plants, for example, have found it pays to replace several small units with a single large mill driven by a General Electric high-voltage synchronous motor with limitamp control. Maintenance is less, output higher. Moreover, with power distributed at high voltage, power losses and first costs are cut.

Money-saving, production-boosting drives like these are used by General Electric engineers when they plan and integrate an electrical system to meet *your* cement plant's particular needs. Find out how they can help you modernize electrically today to increase your cement output tomorrow. G-E engineers can also show you how you can modernize step by step to keep today's production going. Contact your nearest G-E Apparatus Sales office and ask for Bulletin GEA-5469, or write to General Electric Company, Section 658-10, Schenectady 5, New York.

Engineered Electrical Systems for the Rock Products Industry

GENERAL ELECTRIC

Rex® Combination-Durobar® Chain is an ideal chain for many single strand bucket elevator applications. Eccentric barrel feature eliminates much of the grinding action between leading barrel and sprocket tooth . . . adds to life of both chain and sprockets.

Rex Ley Bushed Chain is designed for elevator service under very abrasive conditions. Pins are prevented from turning in side bars, confining flexing action to hardened steel surfaces between pins and bushings. Principal wearing parts are easily renewable.

Rex Chabelco® Chain is an all steel chain of high strength, used extensively for elevating heavy and abrasive bulk materials in cement mills and quarries. Relative light weight combines with strength and hardened wearing surfaces to produce unusual lasting qualities. Also popular as a heavy duty drive chain.

Does your "moving picture" rate 4 stars?

When it comes to moving bulk materials, it's especially important that you get top performance at lowest costs. It makes a big difference in that vital matter of profit or loss. That's why it pays you to investigate the Chain Belt line of materials handling equipment.

Whether your "moving picture" calls for chains and sprockets, belt conveyors, complete bucket elevators, feeders, or apron and pan conveyors, you'll find in the complete Chain Belt line the exact equipment that best fits your requirements for low-cost materials handling.

Rex Engineers are well qualified by years of experience to help you with your design, selection and replacement problems. They are backed by equipment which has been recognized as "tops" in quality for over 60 years. Call your nearest branch office today or write for our new 44 page booklet on Rex Equipment for the Cement and Rock Products Industries. Chain Belt Company, 4649 W. Greenfield Ave., Milwaukee 1, Wis.

CHAIN BELT REX COMPANY

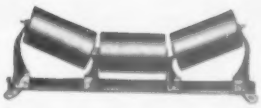
Chain

ATLANTA • BALTIMORE • BIRMINGHAM • BOSTON
BUFFALO • CHICAGO • CINCINNATI • CLEVELAND • DALLAS
DENVER • DETROIT • EL PASO • HOUSTON
INDIANAPOLIS • JACKSONVILLE • KANSAS CITY
LOS ANGELES • LOUISVILLE

Distributors in principal cities
Export offices: Milwaukee and

Rex Heavy Duty Drag Chain has links of massive construction proportioned for strength and wear. Wide-faced barrel acts as a scraper. Used extensively for handling both hot and cold clinker.

Baldwin-Rex® Roller Chain is a high strength, precision-built, finished steel chain widely used in drive applications. Especially suitable where high speeds are encountered. Available in a complete line from ¼" to 2½" pitch.



Rex Belt Idlers are the backbone of all types of belt conveyors. Triple labyrinth grease seal assures longer life and low maintenance costs . . . guards against costly "freeze-ups." Available in a wide range of designs and sizes to suit every application.

Rex Standard Bucket Elevators are made in 3 basic designs . . . Centrifugal Discharge type, Continuous Bucket type and Super Capacity type. All major component parts are made by Chain Belt Company. Specials can be manufactured to order to fit unusual applications.

Rex Temperim® Sprockets have specially hardened rims with extremely uniform tooth contours. They will not wear rapidly even under severely abrasive conditions. Thus, they help to maintain chain pitch and prolong chain life.

Rex Apron and Pan Conveyors are ruggedly built for heavy-duty handling of loose bulk materials. Available in a wide variety of styles to meet requirements of the material being handled. Often used for handling extremely hot material. Square through-rod construction adds to long life.

Rex Elevator Buckets are made of either malleable iron or Rex Z-Metal, carefully molded to assure uniform thickness. Corners are well rounded to assure free delivery of materials. Available in a variety of styles, depending on type of material being handled (Style AA shown).

Belt COMPANY
OF MILWAUKEE

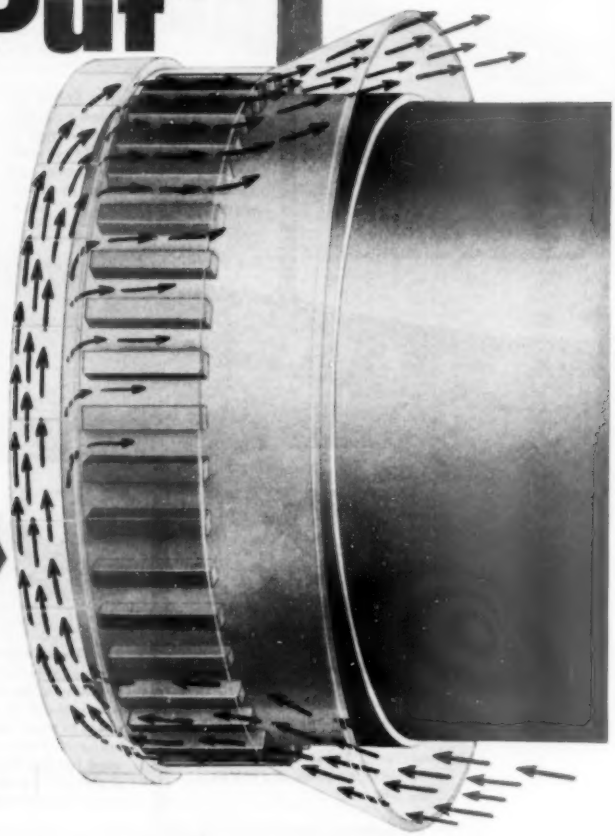
MIDLAND, TEXAS • MILWAUKEE
MINNEAPOLIS • NEW YORK • PHILADELPHIA • PITTSBURGH
PORTLAND, OREGON • SPRINGFIELD, MASS.
ST. LOUIS • SALT LAKE CITY • SAN FRANCISCO
SEATTLE • TULSA • WORCESTER

in the United States and abroad
19 Rector St., New York City

Nose Brick "Stays Put"

in Rotary Kilns Equipped With

ALLIS-CHALMERS Air-Cooled KILN END



Savings in Refractory Brick Will Pay for Air-Cooled Discharge End in 2 to 3 Years!

No end warpage on rotary kilns equipped with this air-cooled discharge end. Hot end stays cool, round and rigid. No shut-downs to replace end brick. In addition to refractory savings, you'll get . . .

MAINTENANCE SAVINGS . . . No loss of valuable production time to replace end brick! Savings in brick, labor and down-time will pay for air-cooled end *several times over* during life of kiln.

AND FUEL SAVINGS . . . Because the discharge end will not distort, the air seal between the firing hood and the kiln continues to be effective after years of service. Fuel savings result when the temperature of the air inside the kiln is not decreased by infiltering cold air.

A-3934

Air-Cooled kiln end can be installed on kilns now in service. Get more facts from the A-C representative in your area, or send for Bulletin 07B6368A. Allis-Chalmers, Milwaukee 1, Wis.

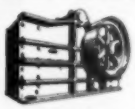
A-C ALLIS-CHALMERS

ALLIS-CHALMERS

Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.

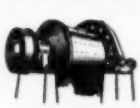
Hammermills

Vibrating Screens



Jaw Crushers

Gyratory Crushers



Grinding Mills

Kilns, Coolers, Dryers

Unworkable Provisions in Motor Vehicle Tax Laws

WAYS AND MEANS to raise needed funds for the building of roads and for other state programs are being given increased emphasis by state legislatures, and a great variety of financing proposals are under consideration. Certain of the suggested tax bills are due to be enacted, and those which would levy new taxes on vehicles, bear watching.

Producers of aggregates and ready-mixed concrete, while they stand to benefit from increased tax revenues that are ear-marked for highway building, should critically examine the provisions of the various tax bills. They should then point out inequities and other shortcomings **before** any of these proposals become law.

These industries certainly are willing to pay their fair share of road and state taxes and have in many cases gone on record as favoring higher gasoline taxes and license fees when such increases are justified. However, levies like the weight-distance or truck mileage taxes, where already applied, have proved undesirable in many respects and every effort should be made to prevent adoption of similar levies. This form of tax is being looked upon with greater favor than other forms of truck taxes and there is likelihood that some states might adopt such legislation.

New York's Law

The way this tax has worked in New York State should make producers in other states vigilant against any movement in that direction. When the tax bill was under consideration, there was no precedent as a guide to its functioning. Producers were led to believe that the tax would only affect the over-the-road hauler who operates over a large area and is held responsible for most of the highway damage but it developed that practically every truck in the state became subject to the tax.

Weight-distance taxes are based on mileages driven within a state and on maximum gross weight except when a truck is empty. In the case of New York State, rates are graduated from six-tenths of a cent per mile for units weighing nine to ten tons, up to two and four-tenths cents per mile for gross weights greater than thirty-one tons. An empty trip of a unit less than nine tons would not be taxed.

For a truck of typical size carrying an average load over a representative distance to a construction project, the tax can very easily amount to ten cents per ton of aggregates which is a substantial increase in the cost of transportation.

The tax applies to all types of trucks including transit-mixer units, the exception being within so-called Public Service Commission zones which are areas immediately around the various cities. The tax applies if a truck goes from one of these zones into another and the rub is that if a single such trip is made by a truck within a calendar month all mileage for that truck during the entire month is taxed.

There have been instances where producers of aggregates have lost substantial income as a result of the tax. A case in point is where a ready-mixed concrete producer within an exempt zone had been buying aggregates from a sand and gravel producer just outside the zone. He chose this source because of a shorter haul but found it necessary to buy his aggregates from a producer within his own zone, once the tax was enacted.

Records the Main Objection

The vast amount of record-keeping and bookkeeping necessary to meet the regulations has proved the most obnoxious provision in the tax law. Accurate mileage records must be kept for each truck each day with separate figures for loaded and empty mileage. No average records are permissible even though a truck makes the same trips every day through the month. A daily record in the form of a manifest trip record must be kept which requires much detailed information.

In addition, all carriers must maintain records including bills of lading, weight bills, freight bills, invoices, shipping orders, dispatching sheets, drivers' daily log sheets, etc., etc., and all must be cross-referenced and filed for audit. Then, there must be records of speedometer readings, of fuel consumption, traffic schedules, etc., etc., all to be available for inspection and records kept for five years. It reminds us of New Deal bureaucracy.

Such a tax bill obviously is difficult to administer and requires bureau control of the type which American business thought was now to be a thing of the past. Wherever enacted, this form of tax will set up a new bureau for its administration which has been proved by experience in several states to eat up a good part of the revenue.

Each producer affected will have to add one or more full-time employes to keep the detailed records required, which amounts to having another tax assessed.

The approach in opposition to such tax laws should be an attack on the record-keeping, which might well build sentiment against the tax.

Bror Nordberg

A New Slant

on Sand Classifying!

Eagle Plant at American Sand Co., Turner, Kansas, makes variety of desired sand blends!

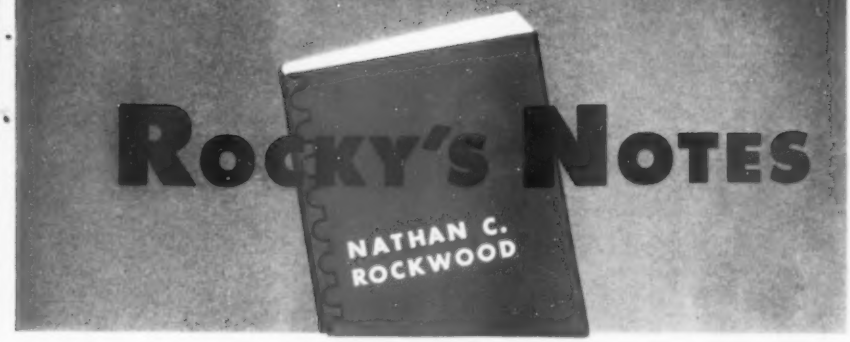
"Seasoned to taste" is the way American Sand Co. turns out sand. Their Eagle Washing, Classifying and Dehydrating Plant scalps off excess water, classifies the sand into various meshes, then blends the sand back together to produce the specification material desired. Hydraulic classification takes place in the Eagle Water Scalping Tank — coarser mesh settling at the feed-in end — finer mesh at the water overflow end and the intermediate meshes in-between. Through adjustable bleeder valves the separated sand flows to a divided collecting-blending flume. Splitters can be adjusted to feed any blend, to either of the Eagle Screw Units for final washing, classifying and dehydrating.

Eagle Equipment—"the last word" in washing and classifying—based upon nearly half a century of experience—can modernize your plant—quickly returning its cost—whether pumping operation like American Sand or dry pit . . . Let a qualified Eagle distributor give you the facts . . . Ask for Catalog 47.

LEADERS IN AGGREGATE WASHING AND CLASSIFYING EQUIPMENT FOR HALF A CENTURY

137 Holcomb Ave., Des Moines, Iowa

EAGLE IRON WORKS



The Virtues of Air-Entrained Concrete

OUR SOMEWHAT FACETIOUS remark about "a little of nothing at all" in concrete being considered by present-day constructors as making better concrete than an equivalent amount of cement—in our discussion on this page in the March issue—presumably has resulted in our friend C. E. Wuerpel, technical director of the Marquette Cement Manufacturing Co., sending us a copy of an address on "Purposeful Entrainment of Air in Concrete." Although we do not admit that we were ignorant enough of the record to require this contribution, we do have only commendation for the simple and effective way Mr. Wuerpel has presented the subject. He is indeed the best qualified man to expound the advantages of air-entrained concrete, for to him more than any other one engineer is due the credit for bringing early experience with air-entrained concrete to the attention of the profession.

We are not aware that we have ever consciously questioned the well-established facts that concrete is improved, at least so far as frost action or freezing and thawing is concerned, by air-entrainment. Also, we agree with our friend Stanton Walker, of the National Sand and Gravel Association, that in some manner air entrainment tends to make better concrete out of some of the not-too-good aggregates. We have expressed doubt from time-to-time that air-entrainment is either the only answer or the final answer to satisfactory concrete; and in this opinion we are of course not alone. We few skeptics, however, are probably classed as merely wilful diehards.

Advantages of Air Entrainment

Returning to Friend Wuerpel's paper, he says: "The air intentionally entrained in mortar and concrete provides a lubricant of high value;" and thus reduces the "water-of-convenience" required in mortar and concrete mixes to provide workability. This reduction of mixing water is of course of direct benefit to the concrete, because the indications are that almost all the troubles of concrete start from too much water retained in or subsequently absorbed by the hardened concrete. The two are probably closely related. However, there are other ways of eliminating excess mixing water, the simplest and most effective of which is to leave it out and make drier mixes. Apparently no engineer user of cement disputes this, but it is objected to because it would require too much change in established construction practices. That attitude is in itself wrong; it is illogical to attempt to adapt the properties of a basic material to faulty methods of using it, instead of correcting the faulty methods.

A second advantage of air-entrainment in placing concrete, as given by Mr. Wuerpel, is that it prevents segregation and bleeding. Segregation from the use of too much mixing water is of course bad practice under all conditions and naturally is universally condemned. However, we doubt if so-called bleeding of concrete has ever been proved deleterious if *purposely* done. When concrete was once placed by thorough tamping, it was bled to a purpose, and the concrete was good. Under the present vacuum process, concrete is purposely bled with startling results in faster strength attainment and better quality. Concrete pavements on porous or specially prepared granular subgrades are purposely bled; that is, excess mixing water is drained off from below, with obvious improvement in the quality of the concrete. In the language of geologists these are all methods of promoting sedimentation, and in any consolidated sediment, or sedimentary rock, the less water and porosity, the closer packed the particles and the better or stronger the rock structure. There is no reason to believe an artificial sedimentary rock, which is portland cement concrete, follows any other natural law.

Mr. Wuerpel also argues that these interior air bubbles, being flexible in adjusting their shapes, not only lubricate the harsh particles in the mix, but permit the particles to readjust themselves in the closest proximity to each other, and hence result in a denser concrete. This is a new one we admit we haven't heard or read about before, but it is hardly in agreement with the laws of sedimentation. Along with this argument is the statement that air entrainment reduces the basic cement paste porosity and the capillary and water channel structure of the mass. That may be, but it would seem to run counter to his later argument that the benefit air-entrainment gives to freezing and thawing resistance of concrete, is the ability of water vapor to flow through these very same capillaries into the air-bubble pockets made by air entrainment, thus relieving interior hydraulic pressures. In doing this the moisture has to push through the bubble walls, so they can't be impervious. We have never seen any proof that air-entrained concrete is any more impervious than other concrete well made.

Possible Chemical Effects

The air-entraining reagents that we have some acquaintance with are in the nature of organic products containing lignin, or they are, or are in the nature of, one of the many colloidal humic acids. If this is so, geochemists or agricultural soil chemists could tell us that such materials have very appreciable chemical effects on mineral combinations, even when present in the fractional percentages used in concrete. Among other things they may be solvents for lime or calcium. Hence, it may be that the air bubbles in air-entrained concrete are sealed with a special kind of cement or calcium silicate gel, and that the effects extend even to the surrounding gel. So far, we have seen no attempt to explain the advantages of air entrainment by anything but physical or mechanical theories. Maybe there is more to it than that. Among the properties of many of these humic acid resins is that of ion exchanger, which from knowledge acquired in other branches of colloid chemistry must certainly have applications to cement and concrete.

That there is also somewhere a chemical explanation seems borne out by a statement in Mr. Wuerpel's paper to the effect that "calcium chloride can be used very successfully with air entraining agents, *but* if added in direct contact with certain prominent [air-entraining] agents, a prompt chemical reaction may occur between the two, which largely inhibits air entrainment. On the other hand, some tests have indicated that when the inhibiting reaction does not take place, the air content is increased about one percent." The chief difference in many chemical reactions between a solution of calcium chloride and one of calcium hydroxide is that calcium chloride being much more soluble (more hydrolyzed) has many more free ions of calcium available for reaction than has calcium hydroxide. It is this faster release of calcium ions, apparently that hastens the set of concrete where calcium chloride is used in proper proportions, for these ions are available for reaction with the silica and alumina gels much faster than the calcium ions released from the calcium hydroxide solution. Also, of course, the introduction of appreciable amounts of calcium chloride into the mix through the release of negatively

(Continued on page 83)

You?...

a Doubting Thomas?

IF YOU'RE a man who has to be shown, we're right in your corner. Just give Roebling "Blue Center" Steel Wire Rope one try... see for yourself how it saves time and costs you less on the job.

Two out of three wire rope users in the quarries prefer Roebling rope. Call your nearest Roebling office for a Field Man to suggest the best ropes for your particular purposes.

ROEBLING CF

A subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 260 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE TRENTON 2, N. J.

LABOR RELATIONS TRENDS

Final Action on Some Pending Cases

By NATHAN C. ROCKWOOD

FROM TIME TO TIME we select certain cases and court decisions as those of most interest to our readers. Some of these decisions are appealed from lower to higher courts, or from local authorities to those higher up. We feel that since we have drawn attention to these cases, we are under obligation to follow them through. Hence, herewith are the final dispositions of some of those cases.

Bad Labor Relations

In our October 1952 article, on this page, entitled "How not to conduct labor relations," we reported the trials and tribulations of the Deena Artware, Inc., Paducah, Ky., in their relations with the United Brick and Clay Workers Union of America (A.F. of L.). The National Labor Relations Board found the company had refused to deal with the union and that it discharged and refused to reinstate 66 employes because they had engaged in a strike. Its order to re-employ these 66 strikers and cease interfering with their right to organize was upheld by the U.S. Circuit Court of Appeals, Sixth District, Cincinnati, Ohio.

In connection with the strike there was some violence and disorder, in which a construction contractor engaged in the erection of a new building for the clay products company was prevented from continuing work. The N.L.R.B. held that this was not a secondary boycott, and hence was a legal strike. However, the clay products company sued the union in the U.S. District Court for damages sustained because of the interruption to construction, by an illegal secondary boycott, and a jury awarded damages to the amount of $29,985.85 (the company had asked $243,605.52). The union carried the case to the same Circuit Court of Appeals, but this higher court also ruled against the union, which had employed its top legal talent from A.F. of L. headquarters. The reason for this was obvious for the unions have always fought all attempts to hold them liable for damages sustained by employers through strikes and boycotts.

Hence, the A.F. of L. carried their appeal to the Supreme Court of the United States through the N.L.R.B. in an attempt to have the lower court decisions reviewed or reversed. The finis is written to this appeal by the Supreme Court decision of March 9, 1953, in which it denied a petition (the N.L.R.B.'s) for a writ of certiorari. This means of course that the union will have to pay the damages awarded the clay products company, and it establishes a precedent the union would like to forget.

Office Time-Clock Case

In our August, 1952 article entitled "Office employes win a time clock and court rebukes F.L.S.A. administrator," we reported the case of a small packing company in Little Rock, Ark., that we believed had many parallels in our rock products industries. The employer paid his office help on the basis that they might on occasion be asked to work in excess of 40 hours a week, but these weekly salaries were established on an hourly basis that provided for time-and-a-half wages for overtime. In other words they had a guaranteed weekly salary whether they worked overtime or not. Each employe worked with the understanding that her (girl office workers only were involved) salary was figured on that basis and that it exceeded the minimum 40-hour week pay plus time-and-a-half.

The U.S. District Court trial judge ruled: "The company's method of compensating its employes was not artificial or culpable, nor was it a device to evade the requirements of the Court's injunction or of the Act; on the contrary, it was entered into in good faith and with the intent to comply with the letter and spirit of the injunction and the Act, and respondents have always believed that it did comply with said injunction and statute.

"As stated, the payroll records of the nonexempt office employes do not, in cases, reflect the actual hours worked by the respective employes in a given work-week, and in this respect said records are technically inaccurate and do not comply with the injunction. The inaccuracies, however, are trivial, and they deceived and prejudiced no one. All of the office employes worked at one time or another on said records and knew how they were being kept and how their compensation was computed. Said records are now being properly kept and maintained."

Hence the company won its case, but was required to pay a compensory fine of $400 to reimburse the F.L.S.A. administrator for the expense of the investigation, and for the cost of instituting and prosecuting the case, since it was technically in civil contempt for not keeping more accurate payroll records. This was a decision of the U.S. District Court on February 27, 1952, following an injunction issued by the same court nearly 10 years previously in favor of the F.L.S.A. administrator. During the interval the packing company had made every effort to comply, but like many small organizations with constantly changing office help, it was rather lax in its time keeping. The chief tangible result of the case was the installation of a time clock and an end to the free-and-easy ways of the office help.

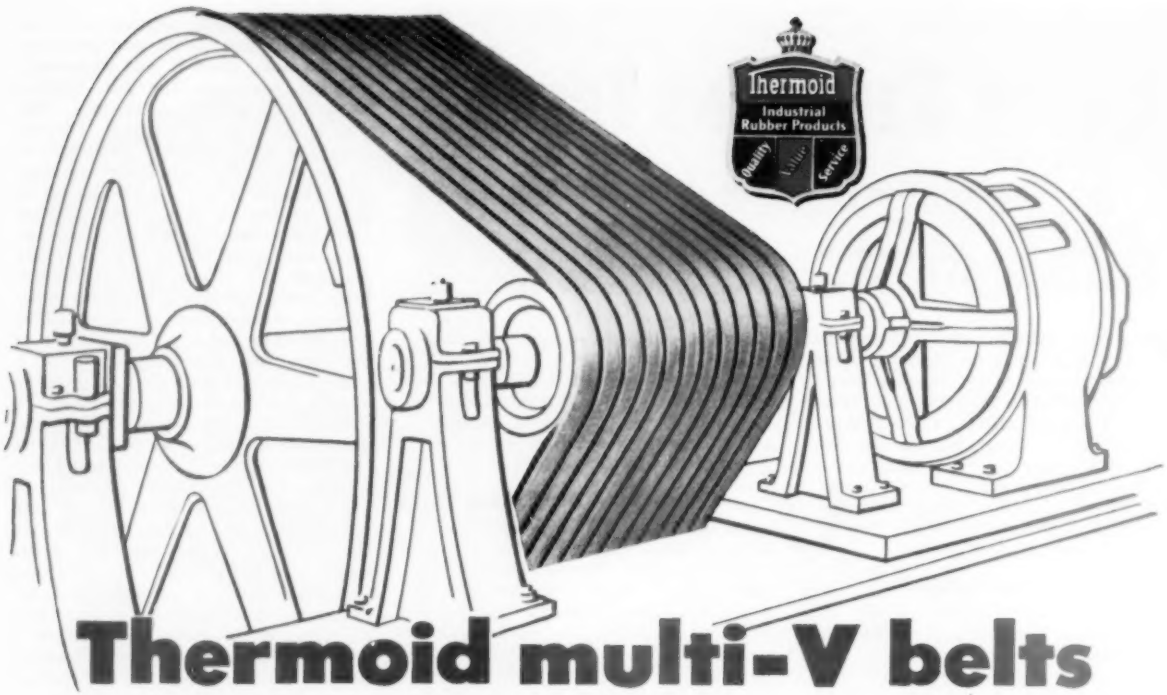
The Court censured the Labor Department in these words: "Despite the trivial nature of the alleged violations, the coöperative attitude of the respondents (the company) and all efforts made by the president of the company to convince the Wage and Hour Division of the innocence and good faith of himself and his company, which included a trip from his office to the Division's office in a distant city, the Division insisted upon filing the instant proceedings and requiring the respondents to stand trial for both criminal and civil contempt; the charges of criminal contempt have completely broken down against all of the respondents, and the charge of civil contempt has been sustained only on the most technical grounds and only in the one respect which will be mentioned in the Court's conclusions of law. Yet these proceedings, largely unjustified the Court's opinion, have caused the respondents unmerited adverse publicity as well as trouble, worry and expense incident to defending the case."

Legality of Guaranteed Wage

Notwithstanding this rebuke the F.L.S.A. administrator carried his case to the U.S. Circuit Court of Appeals, 8th District, St. Louis, Mo., which rendered a decision February 25, 1953. After quoting numerous decisions involving guaranteed weekly or monthly wages, the court said:

"A reading of these cases shows very clearly that the question of the validity of guaranteed wage plans depends upon the particular facts in each case. All of them, regardless of the result on the particular facts involved, stand for the rules that the Fair Labor Standards Act imposes no inflexible form of contract on employer and employe. The test applied in each case is whether the wage rate specified in the contract of employment is fictitious or whether the stipulated rate is in fact the actual rate paid for the normal non-overtime workweek. Contracts of employment in which the stipulated hourly rate bears no relation to the compensation guaranteed by the contract are violative of the Act. Contracts in which, as in the present case, the

(Continued on page 118)



Thermoid multi-V belts

pre-stretched for non-slip performance

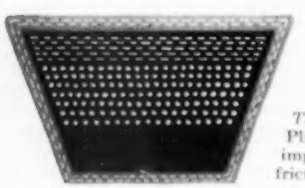
When you use Thermoid *Pre-stretched* Multi-V Belts, you can be sure of maximum power transmission, economical non-slip performance and extra long belt life.

Thermoid Multi-V Belts withstand moisture, abrasion and repeated shock loads.

They're built to take it—specially designed to resist internal friction and heat.

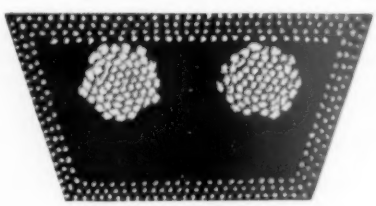
Your Thermoid Distributor can help you with power transmission problems, whether you use Multi-V, F.H.P. or Flat Transmission Belts.

It pays to specify Thermoid.



Thermoid D and E Sections Grommet type construction assures lower permanent stretch, greater flexing ability and shock absorption.

Thermoid A, B and C Sections Plied cord construction, latex impregnated to reduce internal friction and heat build up.



Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

PEOPLE in the news

Elected Vice-Presidents

LOUIS P. STRUBLE, JR., and John K. Beidler have been elected vice-presidents of Dravo Corp., Pittsburgh, Penn. Mr. Struble is general manager

Louis P. Struble, Jr.

of the Keystone Division and Mr. Beidler is general manager of the machinery division. Both are directors of the corporation. Clifford A. Hill was elected treasurer. He was

John K. Beidler

formerly controller and will be succeeded in this position by Edward T. Fitch.

Mr. Struble, a graduate of Lehigh University, began his career with Dravo Corp. in 1935 in the engineering works division. He was appointed general manager of the Keystone Division in 1950, and was elected a director in 1951.

Mr. Beidler also is a graduate of Lehigh University and started with Dravo in 1935 in sales and purchasing work with the machinery division. He was made assistant general manager in 1950 and general manager in 1952. He was elected a director in 1952.

Mr. Hill was graduated from Pennsylvania State College in 1923 and became assistant auditor of Dravo in 1929. He was elected controller in 1944.

Mr. Fitch is a graduate of the Pittsburgh School of Accounting and attended Duquesne University School of Business Administration. He joined Dravo Corp. in 1928 and was named assistant secretary and assistant treasurer in 1942.

District Sales Managers

J. E. PEEPLES has been appointed district sales manager in the Jacksonville, Fla., office of United States Gypsum Co., Chicago, Ill., to succeed Fred Rembert, who has resigned because of ill health. Mr. Peeples was formerly assistant district sales manager in Cincinnati. J. L. Phillips has been appointed district sales manager in Dallas, Texas. He was formerly district sales manager in Detroit and will be succeeded in this position by A. T. Johnson, assistant district sales manager in Kansas City.

Engineer-Manager Retires

C. M. HOWARD, engineer-manager of the Concrete Products Association of Washington, Seattle, Wash., has retired from active management after 24 years of service with the association. He will serve as a consultant to the association and will be available to other clients in a similar capacity. Mr. Howard will be succeeded by W. Stephen Callender, formerly with a structural engineering firm.

Mr. Howard joined the association at the time of its organization in 1929. Recognized nationally as an authority on concrete pipe, he is at present serving on A.S.T.M. committee C-13, and has been a member of the technical problems committee of the American Concrete Pipe Association. He has served as president of the Seattle Section of the American Society of Civil Engineers, the Seattle Post of the Society of American Military Engineers, and the Pacific Northwest Sewage and Industrial Waste

C. M. Howard

Association. He later became national director of the two latter associations. A native of the State of Washington, Mr. Howard graduated in civil engineering from Washington State College in 1913. Following graduation he spent 16 years in highway,

W. Stephen Callender

logging and irrigation engineering and construction in Montana, Oregon and Washington, before joining the Concrete Products Association.

Mr. Callender is a civil engineering graduate of the University of Washington. He was formerly associated with the Crown Zellerbach Corp., and the engineering and light departments of the City of Seattle. For the past three years he has been with W. H. Witt Co., structural engineers, Seattle, where he was employed in structural design work.

Wins Alger Award

COLONEL HENRY CROWN, chairman of the board of Material Service Corp., Chicago, Ill., was recently awarded the Horatio Alger award of

Colonel Henry Crown

the Association of American Schools and Colleges. The award was made by President Eisenhower's brother, Dr. Milton Eisenhower. Col. Crown was one of 11 American leaders to be given the award in their respective professions, which is granted annually to men and women who have made their way to national eminence from humble beginnings, in the manner of Horatio Alger heroes. Col. Crown is also chairman of the board of Marblehead Lime Co., Chicago, Ill.

Association President

JOHN H. RIDDLE, president of Riddle Quarries, Inc., Marion, Kan., was elected president of the newly formed Kansas Limestone Producers Association at a recent organizational meeting in Ottawa, Kan. Marshall E. Carr, Carr Rock Products Co., Neodesha, was named vice-president, and Robert Killough, Ottawa, was made secretary-treasurer. G. W. Baker of Holton, and John J. Stark of Girard, were appointed directors. Bert Ross, Ottawa, was chosen historian for the association. Robert M. Koch, executive secretary of the National Agricultural Limestone Institute, Washington, D.C., spoke to the members on the future of the agricultural liming program.

District Engineer

H. G. WOOD, formerly statewide paving engineer in the Columbus, Ohio, office of the Portland Cement Association, Chicago, Ill., has been appointed district engineer of the Columbus office. He succeeds N. O. Wagner who has resigned. Mr. Wood joined the P.C.A. in 1937 as a field engineer for the Columbus office. Ten years later he was promoted to statewide paving engineer. A graduate of Case Institute of Technology, Mr. Wood received a B.S. degree in civil engineering. Prior to joining the association he was district engineer for the W.P.A.

Production Manager

CARLETON G. SMITHWICK, secretary-treasurer of the Smithwick Concrete Products, Portland, Ore., has been appointed production manager of all Portland and Vernonia operations of the company. He succeeds Otto C. Frei who has resigned to become

Carleton G. Smithwick

Otto C. Frei

president of the Georgia Lightweight Aggregate Co. Carleton Smithwick, son of the president, S. Carl Smithwick, joined the company soon after it was founded in 1946. He successively served as lift-truck operator at the Portland block plant, salesman, production manager at the Eugene division, and superintendent of the Haydite processing plant in Portland.

Chemist Retires

OTTO C. HASSE, chief chemist of The Monarch Cement Co., Humboldt, Kan., has retired as head of the laboratory after 28 years of service with

Otto C. Hasse

the company. A graduate of Case Institute of Technology, Cleveland, Ohio, with a degree in chemistry, Mr. Hasse joined the old Crescent Co. plant at Wampum, Penn., in 1904 and served as chief chemist for over 17 years. He resigned in 1921 to accept the position of superintendent of the Bessemer Limestone and Cement Co., Bessemer, Penn. Four years later he became chief chemist at Monarch Cement Co.

Kaiser Appointments

RALPH E. KNIGHT has been appointed vice-president of Kaiser Aluminum and Chemical Corp., Oakland, Calif., and director of research and development for the aluminum and chemical divisions. Mr. Knight is also vice-president of Kaiser Bauxite Co., and Kaiser Magnesium Co. He was formerly assistant general manager of the chemical division. W. R. Woodman, formerly manager of chemical division operations, has been named manager of the aluminum division's raw material operations. He will have charge of the bauxite mining operations in Jamaica, B.W.I., the alumina plant at Baton Rouge, La., and the fluorspar facilities at Fallon, Nev. Frank M. Cashin, who has been general sales manager of the chemical division, becomes manager of the division. Jack W. Watson, Jr., formerly West Coast manager of aluminum sales, has been appointed assistant to the vice-president and general manager of the corporation. R. A. Fratus, assistant to the comptroller, has been made head of the analysis and planning department.

Association President

KENNETH K. KING, president of King-Eichenlaub, Columbus, Ohio has been elected president of the Columbus Concrete Block Manufacturers' Association. A. G. Cochran, Ohio sales manager of Universal Concrete Pipe Co., Columbus, was elected vice-president, and John F. Royer, was renamed secretary-treasurer.

Chief Engineer

W. A. ROBERSON, who has been in charge of engineering personnel for The Kelley Island Lime and Transport Co., Cleveland, Ohio, has been appointed chief engineer of all plants. He succeeds Earl C. Harsh, who has retired. Mr. Roberson will continue to make his headquarters at the White Rock plant, Clay Center, Ohio.

OBITUARIES

WALTER W. PATNOE, chief engineer, Basic Refractories, Inc., Cleveland, Ohio, died suddenly at his home in Bay Village, Ohio, on March 4. He was 65 years old. Mr. Patnoe joined the company in 1916 as plant engineer and construction superintendent. He was manager of the Maple Grove, Ohio, plant for many years and had been chief engineer since 1924. Prior to joining Basic Refractories, Mr. Patnoe served as engineer and superintendent for Stephens-Adamson Manufacturing Co., and for several years as design engineer for the Buckbee Engineering Co., Chicago. He had also served as a plant engineer for Dolese and Shepard Co., Chicago, the Iowa Portland Cement Co., Des Moines, Iowa, and the Toledo Stone and Glass Sand Co. A native of Chicago, Ill., Mr. Patnoe was an engineer of broad experience. He designed and supervised construction of the magnesite processing plant at Gabbs, Nev., and also designed and supervised construction of a new plant for the production of dead-burned dolomite at Maple Grove, Ohio.

R. C. RIED, well-known consulting engineer in the cement and lime industries, died March 27. Born in West Conshohocken, Penn., Mr. Ried was a graduate of Villionova College. He started his business career as a draftsman for the Valley Forge Cement Co., subsequently becoming assistant plant engineer and then plant engineer. He assisted with the design of the original Breerwood, process of flotation for cement raw materials.

In 1935, Mr. Ried joined Separation Process Co. as flotation engineer. He operated the test pilot plant of Universal Atlas Cement Co. at Northampton, Penn., and also designed the flotation plant of Lone Star Cement Corp. at Parana, Argentina, installing equipment and operating the plant for two years. He assisted with the design of the flotation plant for Permanente Cement Co., San Jose, Calif., assisting with the entire plant design and operating the plant during the starting-up period.

In 1940, Mr. Reid returned to the Valley Forge Cement Co. as assistant superintendent and later became superintendent, resigning in 1947 to become senior partner of Knowles Associates, consulting and designing engineers. In 1951 he formed his own engineering concern under the name of R. C. Ried—Engineers, to enable him to devote his full time to the nonmetallic minerals industries, with particular emphasis on lime and cement.

Mr. Ried was a member of the American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, Engineering Society of Western Pennsylvania and the Architects and Engineers Club of New York.

J. R. WITHROW, professor emeritus in the school of chemistry and chemical engineering at Ohio State University, died March 20 at the age of 77. Born in Philadelphia, Dr. Withrow studied at the University of Pennsylvania, winning a Ph.D. degree in 1905. He started his career as a chemist with Barrett Manufacturing Co. in 1899, but returned to academic life in 1905 as assistant instructor in chemistry at the University of Illinois. He joined Ohio State University in 1906 as assistant professor, became professor in 1912 and was made head of the department in 1923. Dr. Withrow was at one time chairman of Committee C-7 on Lime of the American Society for Testing Materials and was author of numerous papers on lime.

ERASTUS P. SNOW, secretary and treasurer of the Portland Cement Co. of Utah, Salt Lake City, Utah, died February 7. He was 61 years old. Mr. Snow attended the Latter Day Saints University, the University of Utah and Columbia University. A veteran of World War I, he served with the 145th Field Artillery. After his discharge from the Army he became associated with the Portland Cement Co. of Utah, as well as the Salt Lake, Garfield and Western Ry. Co. and the Saltair Beach Co. He was also a director of the Hotel Utah.

LEMUEL B. CARNES, JR., president of the Standard Sand and Silica Co., Davenport, Fla., died February 19 at his home in Haines City, after a short illness. He was 52 years old. Born in Marietta, Ga., Mr. Carnes graduated from the Marietta High School and the Georgia Institute of Technology, Atlanta, Ga. He had been president of the firm for the past nine years.

T. R. ELLERBECK, vice-president and general manager of The Utah Lime and Stone Co., Salt Lake City, Utah, died March 14 after a long illness. He was 52 years old and had been associated with the company since his graduation from the University of Utah. Mr. Ellerbeck was also president of The Ellernan Co. and co-inventor of the Ellernan calciner. He was a member of the board of directors of the National Lime Association.

DONALD R. SUTHERLAND, vice-president in charge of sales of the Giant Portland Cement Co. and the Carolina Giant Cement Co., Philadelphia, Penn., died March 2 at the age of 49. Mr. Sutherland had been in the cement industry for more than 30 years. A native of Kenosha, Wis., he joined the Giant Portland Cement Co. in 1946, and was elected vice-president of the company in August of 1951.

FRANK M. MAHER, former president of the Salt Lake Valley Sand and Gravel Co., Salt Lake City, Utah, which he founded in 1929, died January 18 after a short illness. He was 68 years of age. Mr. Maher was sales manager for the Salt Lake City office of Ideal Cement Co. until his retirement in 1945.

PHILIP HENRY HAMPSON, former general manager of the Nazareth Cement Co., Nazareth, Penn., died January 19. He was 86 years of age and had retired in 1933. At the time of his retirement he was serving in the purchasing department of Bethlehem Steel Co., which he joined in 1908.

ALBERT B. STALL, treasurer of the Portland Cement Association, Chicago, Ill., died February 25 at his home in Wilmette, Ill., after a short illness. He was 59 years of age and had been associated with the P.C.A. for 35 years.

RANDALL A. FOLLEY, sales representative of the Columbia cement division of Pittsburgh Plate Glass Co., Pittsburgh, Penn., died February 9 at the age of 67.

MISS GRACE E. GILSON, retired official of the Valley Sand and Gravel Co., Rochester, N.Y., died January 14 at the age of 83. She retired from the firm about five years ago.

JOSEPH MOELLER, a director of the Wapak Sand and Gravel Co., Lima, Ohio, died February 25 after a six-month illness. He was 79 years old.

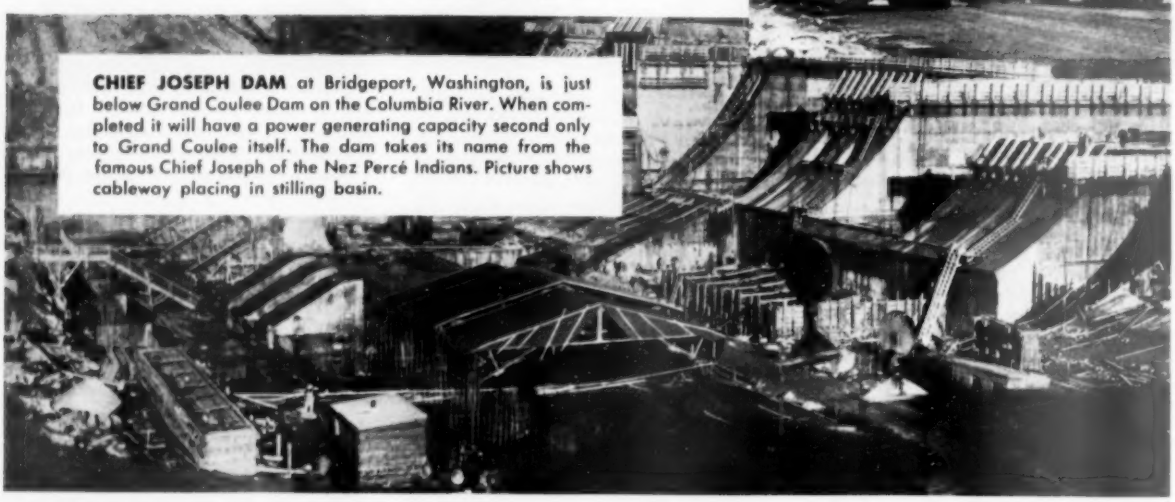
HOLLIE M. BROWN, chairman of the board of the Newark Sand and Gravel Co., Newark, Ohio, died suddenly on January 8. He was 59 years of age.

HIRAM C. MARTIN, superintendent of the Batesville White Lime Co., Batesville, Ark., passed away January 21 at the age of 67.

HOW CONTRACTORS* SPEED WORK ON CHIEF JOSEPH DAM

...with TEXACO SIMPLIFIED LUBRICATION

THIS IS only a tiny part of the vast quantity of equipment used on the Chief Joseph Dam project. All of it is lubricated exclusively with Texaco.



CHIEF JOSEPH DAM at Bridgeport, Washington, is just below Grand Coulee Dam on the Columbia River. When completed it will have a power generating capacity second only to Grand Coulee itself. The dam takes its name from the famous Chief Joseph of the Nez Percé Indians. Picture shows cableway placing in stilling basin.

CHIEF JOSEPH BUILDERS,* a combine of four principal contractors, is doing the construction work for Chief Joseph Dam proper. In addition to a vast amount of heavy construction equipment — bulldozers, scrapers, trucks, shovels, etc. — the project involves tremendous cableways, one of the biggest refrigerating plants in the Northwest, a giant gravel crushing plant, and much more besides.

All this equipment and machinery is lubricated exclusively with Texaco. The Texaco Lubrication Engineer servicing this project worked out for the Chief Joseph Builders a Simplified Lubrication Plan—by which all major lubrication is handled with only six Texaco Lubricants.

"The Texaco Simplified Lubrication Plan," says Chief Joseph Builders, "has been a big help to us. By reducing the number of lubricants we have to use, we have substantially reduced the chance of error in application, and have speeded our maintenance work. And, of course, the always-fine quality of Texaco Lubricants has been an important factor in keeping our equipment on the job and our maintenance costs low."

Let a Texaco Lubrication Engineer work out a Texaco Simplified Lubrication Plan for *your* next project. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

*THESE ARE THE CHIEF JOSEPH BUILDERS: The Arundel Corporation, Baltimore, Md.; L. E. Dixon Company, San Gabriel, Calif.; The Hunkin-Conkey Construction Company, Cleveland, Ohio; American Pipe & Construction Co., Los Angeles, Calif.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

TUNE IN: Tuesday nights on television—the TEXACO STAR THEATER starring MILTON BERLE. See newspaper for time and station.

industry news

Wins Emblem Contest

A DAY-AND-NIGHT EMBLEM used by Calaveras Cement Co., San Francisco, Calif., recently won a first prize in a nation-wide emblem contest, sponsored by Minnesota Mining and Manufacturing Co., St. Paul, Minn.

Calaveras Cement Co.'s prize-winning, day-and-night emblem

The emblem, which is used on store fronts and trucks to identify Calaveras dealers, is made of "Scotchlite," a reflective sheeting containing microscopically small glass spheres which reflect light from automobile headlights. The emblem is designed with a silver background with pictorial forms and lettering in four colors, red, green, blue and black, which are said to be discernable a block and a half away. Another feature of the prize-winning emblem is its "wide angle" property which permits visibility regardless of the angle from which the emblem is viewed.

Award-winning emblems are chosen on the basis of their styling, design and day-and-night effectiveness. Designer of the Calaveras emblem was Hawkins and Hawkins Co., Berkeley, Calif.

Haydite Plant

UNITED CEMENT PRODUCTS CO., Wichita, Kan., is planning to build a $300,000 sintering plant in the Darby, Kan., area for the production of Haydite aggregate from Kansas clay. Plant capacity will be 300 cu. yd. of lightweight aggregate per day.

Marquette Production

MARQUETTE CEMENT MANUFACTURING CO., Chicago, Ill., reportedly shipped 11,300,000 bbl. of cement in 1952, which was a 19 percent increase over 1951 shipments. The increase was due primarily to the opening of the company's new plant at Brandon, Miss., and the installation of a new kiln at the Des Moines, Iowa, plant. Shipments in 1953 are expected to remain about the same as for 1952. The company spent $1,750,000 in 1952 for replacement of facilities. During 1953, it expects to modernize packing and shipping facilities at St. Louis, Mo., Memphis and Nashville, Tenn., and also plans to build additional storage capacity at Memphis and improve its facilities at Cape Girardeau, Mo., and Cowan, Tenn., to increase capacity of these two plants by an additional 150,000 bbl. per year.

Mica Supply Decreases

THE NATIONAL PRODUCTION AUTHORITY recently revealed that supplies of high-grade mica are decreasing, even though the needs for the material have been increasing. Demand for low-grade mica, however, has decreased, due to the development of synthetic materials and improved methods of reclaiming scrap. Since both grades are found in the same deposits and are mined together, it is placing mica producers in a rather difficult situation.

The General Services Administration, to offset the drop in production, has announced that it will purchase up to 25,000 tons of hand-cobbed mica for the national stockpile within the next year.

Management Award

THE ARUNDEL CORP., Baltimore, Md., has been awarded a Certificate of Management Excellence for the year of 1952 by the American Institute of Management, New York, N.Y. This is the third consecutive year in which the company has received an A.I.M. award. Qualification for an award is judged on ten areas of management: economic function; corporate structure; health of earnings growth; fairness to stockholders; research and development; directorate analysis; fiscal policies; production efficiency; sales vigor; and executive evaluation.

New Limestone Plant

THE MICHIGAN LIMESTONE DIVISION of United States Steel Corp., recently announced plans to build a limestone quarrying and processing plant on a 10,000-acre site near Cedarville, in Michigan's upper peninsula. The plant, which is scheduled for completion late in 1954, is expected to produce about 3,000,000 tons of dolomitic limestone per year.

Oklahoma Ilmenite

THE OKLAHOMA GEOLOGICAL SURVEY has announced the publication of Circular No. 30, entitled "Ilmenite in Alluvial Sands of the Wichita Mountain System, Oklahoma," by Gerald W. Chase. The investigation on which the report is based was undertaken to determine whether deposits of ilmenite-bearing sands have sufficient volume to offer economic possibilities. Several test holes were put down in the area and the samples were subjected to laboratory studies which indicate the deposit has potential commercial value. The most promising area appeared to be around Lake Lawtonka. The report is available from the Oklahoma Geological Survey, Norman, Okla., for $0.60 per copy.

Cover Picture

BECKER COUNTY SAND AND GRAVEL Co. constructed a unique suspension bridge conveyor to carry up to 350 t.p.h. a distance of ¼ mile across Cape Fear River to the screening tower of the Fayetteville, N.C. plant. A flume, shown to the right in this month's cover picture, takes waste to the river. This is one of the plants supplying aggregates for the construction of a new atomic-weapons plant. Loading at the pits is handled by Lima and Northwest draglines dumping to five bottom-dump haulage units, two Euclids and three Heils, all driven by Fuller transmissions. The haulage units average three round trips of about 1½ miles each per hour.

Fluorspar Discovery

ANNOUNCEMENT was recently made of the discovery of a new fluorspar deposit in Idaho. Although the exact location was not given, it was reported to be "far back in one of the roughest mountain areas of the United States." It was estimated that the deposit, which occurs in a nearly vertical fissure vein, 4 to 30 ft. wide, and traceable for ten miles, contains several million tons of acid-grade and metallurgical-grade fluorspar available for mining, much of it by open-pit methods.

New York Talc Production

NEW YORK STATE produced nearly one-third of all talc mined in the United States and over 10 percent of the world output in 1951, according to a report by the New York State Department of Commerce. Approximately 175,000 short tons of talc, valued at $4,525,000, were produced in New York in 1951, which was an all-time record. National production in 1951 amounted to 516,068 short tons, while world production was an estimated 1,700,000 tons.

Seven mines are in current production in St. Lawrence County, which are operated by International Talc Co., Inc., Loomis Talc Corp. and Gouverneur Talc Co. Carbola Chemical Co. operates a talc mine in Lewis County.

Well over half of the annual talc production is now used by the paint industry, while the second most important user of New York talc is the ceramic industry. It is also used in rubber tire and insecticide manufacture, and as a filler in putty, wall plaster, linoleum and textile fabrics.

Huron Scholarship Awards

HURON PORTLAND CEMENT CO., Detroit, Mich., recently announced the establishment of three college scholarships to be granted each year to sons of employes of the company's Alpena plant and Paxton shale quarry and sons of Huron Transportation Co. seamen and officers. Each year, two scholarships will be awarded to graduating students at Alpena High School and one to a graduate of Alpena's Catholic Central High School. The grants will be in the amount of $200 per year for the first two years and $800 for each of the last two years. Awards will be based upon scholastic ability, character, potential qualities of leadership and financial need. Selection of applicants will be made by the Faculty Scholarship Committee of Alpena Community College.

Canadian Asbestos Production

A. L. PENHALE, president, Asbestos Corp., Ltd., Thetford Mines, Que., in a review of the Canadian asbestos industry in 1952, stated that asbestos production was maintained at a high level throughout the year and that preliminary figures showed that approximately 880,000 short tons were produced. However, it was a little under 1951's record production of 967,000 tons.

The difference in tonnage between 1951 and 1952 was said to be due to the lower volume of short fibers produced. Demand for short fibers fluctuated throughout the year but strengthened towards the end of the period. For all other grades, particularly the spinning grades, the demand far exceeded the supply. Canada maintained its position in 1952 as being the world's major source of chrysotile asbestos.

Expansion plans, amounting to approximately $35,000,000, were initiated last year by several producers. Several new mining companies have been formed and it is expected that some new mines will be brought into production in the near future. Prominent among these developments is the Cassiar asbestos property in northern British Columbia, which is scheduled for production next year.

Major markets for Canadian asbestos in 1952, in the order of importance, were the United States, Western Europe, South America and Australia.

Portland Cement Production

THE PORTLAND CEMENT INDUSTRY produced 17,325,000 bbl. of finished cement in February, 1953, as reported to the Bureau of Mines. This was an increase of 5 percent compared with the output in February, 1952. Mill shipments totaled 14,155,000 bbl., a decrease of 1 percent from the February, 1952, figure, while stocks were a fraction of 1 percent below the total for the same month in 1952. Clinker production during February, 1953, amounted to 18,917,000 bbl., an increase of 2 percent compared with the corresponding month of the previous year. The output of finished cement during February, 1953, came from 155 plants located in 37 states and in Puerto Rico. During the same month of 1952, 16,545,000 bbl. were produced in 151 plants.

Adds to Product Line

THE NATIONAL CITY, MICH., PLANT of National Gypsum Co., Buffalo, N.Y., has added a new line of exterior walls and interior siding to its present line of interior wall and ceiling materials. The additional line of products was made possible by the company's purchase of Asbestone Corp. which has plants in New Orleans, La., and St. Louis, Mo. National's new products include asbestos-cement siding, roofing shingles, corrugated and flat boards, and other industrial products. Cost of the Asbestone Corp. acquisition was reported to be approximately $5,000,000.

Pavement Yardage

AWARDS OF CONCRETE PAVEMENT for the month of March and for the first three months of 1953 are listed by the Portland Cement Association as follows:

	Sq. yd. awarded	
	During March 1953	During first three months 1953
Roads	3,214,516	7,317,899
Streets and alleys	2,139,526	4,698,387
Airports	1,651,512	3,372,306
Totals	7,005,554	15,388,592

Jamaica Cement Plant

CARIBBEAN CEMENT CO., LTD., which recently completed the first year of operation of its 600,000-bbl.-per-year plant at Kingston, Jamaica, reportedly has established what may be a record first year result. In its first year of operation, the company has declared a 6 percent cash dividend on its common shares, plus a 25 percent stock dividend, besides redeeming more than $200,000 worth of debentures. These payments were in addition to the payment of interest on borrowed capital, the setting aside of normal depreciation reserve and the maintenance of working capital.

Organized by American and Canadian interests, with capital and other assistance from Great Britain, Jamaica and Bermuda, the Caribbean Cement Co. has been in operation since the beginning of February, 1952, and is under the chairmanship of Sir William Stephenson, internationally known Canadian industrialist. The American-Canadian arm of the company is Cement and General Development Corp., New York, N.Y., which participates in the management of the Jamaica company as part of its international cement and industrial development activities.

A spokesman for Cement and General Development Corp. stated that the Jamaica company's net profit available for distribution will exceed $400,000 for its initial eleven months of operation. The outstanding first-year record was said to result mainly from the favorable location of the plant which is close to all of its principal raw materials, fuel, power and principal markets. Another factor was said to be the plant's relatively low capital cost which was approximately $3,200,000, including the power plant, deep-water wharf and working capital. Capital cost per annual barrel of production was said to be $5.53, while capital cost of equivalent units in the United States and Canada currently ranges from $7 to $12 per annual barrel.

New England Mica

TEN MICA MINES are now in operation in New Hampshire, as recently reported by the superintendent of the government mica depot at Franklin, N.H. Only one mine was in operation prior to the recent establishment of the government purchasing depot, which is now making preparations for the purchase of beryl, a by-product of mica and feldspar mines.

To Rebuild Plant

WESTERN LIMESTONE PRODUCTS CO., Omaha, Neb., is rebuilding its limestone plant at Weeping Water, Neb. The plant was recently destroyed by fire. Harry Schellburg is president of the company.

Safety Banquet

CALIFORNIA PORTLAND CEMENT CO., Los Angeles, Calif., whose plant is located at Colton, Calif., recently held a "kick-off safety dinner" to inaugurate its new plant safety campaign. Approximately 450 officials, employes and guests were in attendance. Theme of the program was "Accident Free in '53."

Ivan F. LeGore, manager of the Accident Prevention Bureau of the Portland Cement Association, Chicago, Ill., was the principal speaker of the evening. Hal Kellogg, safety supervisor, outlined the 1953 safety program, explaining the awards which will be made to employes whose sections have accident-free operations. There are nine sections which will compete for a monthly $50 award. Annual awards will total $400.

Other officials and guests attending the safety dinner included Archie McCall, L. E. Bancroft, Ernie Hendrickson and Wilson Hanna, vice-presidents of the company; Paul Young, mayor of Colton, Calif.; and George Blair, mayor of San Bernardino, Calif.

Plans Phosphate Plant

THE F. S. ROYSTER GUANO CO., Norfolk, Va., plans construction of a triple superphosphate plant near Mulberry, Fla., which is expected to cost in excess of $3,000,000. Although the company has not been active in the Hillsborough-Polk phosphate fields for about 30 years, it is said to have extensive holdings of high grade rock in Polk County, and also to be among the largest fertilizer manufacturers in the country. The phosphate will be used in the manufacture of fertilizer at the company's 20 plants, located largely in the South and Middle East. The plant is expected to be operation early in 1954.

Leases Gypsum Plant

CARDIFF GYPSUM CO.'S plaster plant near Fort Dodge, Iowa, has been leased by Robert Wasem, formerly with Celotex Corp., Chicago, Ill. The Cardiff plant is one of the oldest gypsum plants in Fort Dodge and is principally owned by Chicago interests. Crushed gypsum rock from which the plaster is made is purchased from another quarry in Fort Dodge. Capacity of the plant is approximately 30,000 tons annually.

Development Program

BASIC REFRACTORIES, INC., Cleveland, Ohio, has asked its stockholders to authorize action necessary to expand and improve its Gabbs, Nev., plant, and also to simplify and strengthen the company's capital structure by increasing the ratio of invested capital to funded debt and materially reducing its annual cash requirements for debt amortization. The action to be authorized is the issuance of 10,000 additional shares of preferred stock to be sold to Investors Diversified Services, Inc., and the granting of options on 42,600 common shares of which 30,000 would be to I.D.S.I. and the balance to Mutual Life Insurance Co.

The new move calls for the raising of $1,000,000 to be used as follows: $400,000 to improve the efficiency of the Nevada plant; $370,000 to reduce and effect desired modification in term loans; and the balance to augment working capital.

Safety Record

THE EAST FULTONHAM, OHIO, PLANT of Pittsburgh Plate Glass Co., Columbia Cement Division, Zanesville, Ohio, recently completed its third consecutive year without a lost-time accident. The 3-year safety record involved 2,360,255 man-hours of exposure. The plant became a member of the Portland Cement Association's "1000 Day Club" in July, 1952, and has received P.C.A. safety trophies for the years of 1931, 1935 and each year since 1947.

R. J. Hearing, safety and welfare director, inspects bulletin board which records the plant's safety record

Asbestos Plant

ASBESTOS CORP., LTD., Thetford Mines, Que., has been granted a permit to build an asbestos processing plant in the Coleraine-Black Lake area of Quebec's eastern townships. The company also plans to spend approximately $10,000,000 for the development of an asbestos mine in the area.

Cement Production

CONTINUED HEAVY DEMAND resulted in a new record output of cement in 1951, as reported by the Bureau of Mines. Production of portland cement amounted to 246,022,476 bbl., an increase of nearly 9 percent over 1950 output. Production of hydraulic cements—natural, masonry and puzzolan—amounted to 3,449,463 bbl., which was a decrease of 19 percent from the previous year.

Shipments of portland cement in 1951 totaled 241,153,272 bbl., valued at $613,170,483, as compared to 227,756,636 bbl., valued at $535,321,123, in 1950. The average value amounted to $2.54 per bbl. in 1951, compared with $2.35 per bbl. in 1950. Shipments of other hydraulic cements showed an 18 percent decrease from the 1950 figure.

Based on the quantity of cement shipped to destinations in the various states, consumption was higher in 1951 in 29 states and lower in 19 states and the District of Columbia than in 1950. States showing outstanding percentage gains in apparent consumption were Maine, Oregon, Ohio, Florida and Nevada. Declines were greatest in South Dakota, Arkansas, New Mexico, New Hampshire and Oklahoma.

The estimated annual capacity of the portland cement industry at the end of 1951 was 281,532,328 bbl., compared with 268,273,305 bbl. at the end of 1950. The percentage of capacity utilized in 1951 was 87.4, compared with 84.3 percent in 1950.

All types of fuel used in the portland cement industry were used in greater quantity in 1951 than in 1950. The percentage gains were reported as follows: coal, 7 percent; fuel oil, 29 percent; natural gas, 19 percent; by-product gas, 30 percent. Coal, however, was used in the production of 48 percent of the total output of cement.

A breakdown of the total production of portland cement showed that the output of each type, except oil-well, white and miscellaneous cements, was higher in 1951 than in 1950. The most outstanding gains were made in low-heat (Type IV), portland-puzzolan and air-entrained cements. Production of low-heat (Type IV) cement amounted to 900,624 bbl. in 1951, compared with 328,879 bbl. in 1950; sulfate-resisting (Type V), 9908 bbl. in 1951, compared with 4070 bbl. in 1950; portland-puzzolan, 2,279,023 bbl. in 1951, compared with 1,369,764 bbl. in 1950; air-entrained, 24,201,376 bbl. in 1951, compared with 21,717,585 bbl. in 1950.

The total surplus of 31,214,869 bbl. of cement in producing states was distributed as follows: 28,479,713 bbl. to non-cement-producing states, Alaska and Hawaii; 2,727,647 bbl. to destinations outside the United States; and 7536 bbl. to unspecified destinations.

Shipments of portland cement by rail continued to decline, but still accounted for 72 percent of the total. Truck shipments constituted 27 percent of the total, while the remaining 1 percent was shipped by boat. Bulk shipments of cement again increased considerably, amounting to 61 percent of all shipments in 1951.

A.S.T.M. 50-Year Index

AMERICAN SOCIETY FOR TESTING MATERIALS has issued a "50-Year Index to A.S.T.M. Technical Papers and Reports." The publication provides a detailed author and subject index to all A.S.T.M. reports dealing with materials, particularly their properties and testing, appearing in A.S.T.M. publications covering the period from 1898 through 1950. The index is concerned basically with technical papers which have appeared in proceedings, *A.S.T.M. Bulletin*, special technical publications, or special compilations of standards. In addition, a number of technical reports have been referenced which, while not credited to a specific author, provide additional data and information worthy of consideration when searching for available data on a specific subject. Many of these reports are the result of cooperative effort in technical committees.

Copies of this 216-page, cloth-bound publication can be procured from A.S.T.M. Headquarters, 1916 Race St., Philadelphia 3, Penn., for $6.00 per copy.

Predicts Prosperity Era

MELVIN H. BAKER, chairman of the board of National Gypsum Co., Buffalo, N.Y., recently expressed his belief that a rebirth of morale in government will bring with it an era of prosperity for business in general and the construction industry in particular. He sees 25 percent more employment and production in the next 10 years along with a reduction in excess profits and individual taxes, probably in 1954. Mr. Baker made his predictions during a recent trip to New Orleans, La., where he inspected his company's latest acquisition, the Asbestone Corp., which is now a wholly owned subsidiary of National Gypsum Co.

Annual Perlite Report

PRODUCTION OF EXPANDED PERLITE continued to rise in 1952, but the annual rate of increase seems to be leveling off, as reported by the Perlite Institute in its 1952 annual report. The perlite industry produced more than 33 times as much expanded perlite in 1951 as in 1946. Perlite Institute officials attribute the growing stability of the perlite market to the fact that while mining is confined to seven western states, perlite expanding plants are now established in 32 states. The increase in number and the wide dispersal of these plants made possible short-haul shipments to nearly the entire U.S. market for the first time. Future growth of the industry is therefore expected to depend less on expansion into new geographical markets, and more on intensive selling in the existing markets, as well as the development and exploitation of new uses of the product. To date, the primary use for expanded perlite has been as a lightweight aggregate for plaster and insulating concrete.

On the basis of preliminary estimates, expanded perlite production in 1952 amounted to approximately 150,000 tons, valued at $8,000,000. In 1951, sales of expanded perlite totaled 133,175 tons, compared with 86,962 tons in 1950.

Concerning the outlook for 1953, the Institute predicts an even bigger year, volume-wise, for perlite production, and bases its prediction on the following three factors:

1. All indications point to a continued high level of construction activity in 1953.

2. The Perlite Institute expects to stimulate the acceptance of perlite by architects and plastering contractors with the announcement early in 1953 of a strictly enforced "product certification program." Under this program, participating producers will be licensed to use an official "Certification Seal" so long as their product measures up to specification C 35-52 T of the American Society for Testing Materials.

3. The institute will continue research work which is expected to establish new markets for the use of special grades of expanded perlite as a filter powder and as a foundry material.

Feldspar Plant

BELL MINERAL CORP., newly incorporated, has established a minerals plant in West Paris, Maine. The company produces "Oxford" feldspar which is used in scouring powders, polishes, as a filler in plastics and also in vitrified ceramics, semi-porcelains, porcelain, pottery and enamels. The company also produces a non-skid floor powder for wet or slippery floors.

Officers of the new corporation include Richard Bell, Bell Clay Co., Gleason, Tenn., president, and W. Wallace Roff of Whittaker, Clark & Daniels, Inc., New York, N.Y., vice-president. Whittaker, Clark & Daniels, Inc., has been appointed eastern sales representative for the company.

Celebrates Safety Record

THE MILLVILLE, W. VA., PLANT of Standard Lime & Stone Co. recently celebrated its 3-year safety record at a special banquet. The plant has operated since December, 1949, without a lost-time accident. In addition to the current 3-year span, upon which time is still accumulating, the Millville plant also has six 1-year periods of accident-free operation to its credit. Officials attending the celebration included Daniel Baker, Jr., president; W. D. Garvin, general superintendent; O. L. Wilt, plant superintendent; and C. W. Kelican, safety engineer.

Haydite Raw Materials

A REPORT ON HAYDITE RAW MATERIALS in Matanuska Valley, Alaska, was recently released by the Geological Survey. The report describes two areas in Matanuska Valley where suitable haydite raw materials have been found. One area is located 67 miles northeast of Anchorage, along the Glenn Highway; the other is along the Alaska Railroad, near Sutton and 55 miles northeast of Anchorage. Geologic and topographic maps of these areas are included in the report.

At the locality along the Glenn Highway, the raw material is argillite; near Sutton it is shale. Bloating tests by the Bureau of Mines indicate the argillite and shale of these areas will yield a satisfactory lightweight product. Reserves of the Glenn Highway locality are estimated to be about 8,000,000 short tons, with an additional reserve of about 27,000,000 short tons of argillite containing 10 percent or less interbedded graywacke. Reserves of the most favorable locality in the Sutton area are about 25,000,000 short tons. Both localities are favorably located in regard to transportation, fuel and markets. Other potential haydite raw materials are also briefly discussed.

Copies of the report may be obtained free on application to the Director, Geological Survey, Washington, D.C. Copies have also been placed on file, where they will be available for use by the public, in the Geological Survey offices in Washington, D.C.; San Francisco, Calif.; Juneau, Anchorage and Fairbanks, Alaska; in the Territorial Department of Mines office at Juneau; and at the Bureau of Mines office in Anchorage.

Research Report

THE ARMOUR RESEARCH FOUNDATION of Illinois Institute of Technology, Chicago, Ill., a non-profit, research and development organization serving industry, has announced the publication of its 1952 annual report. This 64-page, illustrated report describes more than 275 of the 397 research and development projects undertaken by the Foundation in 1952. The projects described include the following: Acoustical Materials and Instrumentation; Construction Materials; Industrial Noise Control; Instrumentation; Noise Reduction in Mechanical Equipment; Refractories; and Welding and Brazing.

Cement Plant Expansion

PEERLESS CEMENT CORP., Detroit, Mich., is resuming its $3,300,000 long-range expansion and improvement program started in 1949. The project had been held up about a year, due to delays in government allocations of steel. Currently underway is the rehabilitation of the No. 1 kiln at the Port Huron, Mich., plant.

N.L.A. Convention

THE NATIONAL LIME ASSOCIATION will hold its 51st annual convention at The Homestead, Hot Springs, Va., June 8-10, 1953. On Sunday morning, June 7, preceding the convention sessions, there will be a meeting of the board of directors and executive committee. The convention program is scheduled as follows:

Monday, June 8

The convention will be opened at 10:00 A.M., with a welcoming address by President Wallace E. Wing, followed by miscellaneous association business, announcements and safety report. Robert S. Boynton, general manager, will report on the association's past-year activities. Other speakers will include S. Walter Stauffer, member of Congress and past-president of N.L.A., whose address will be primarily concerned with Congressional life and the new regime in Washington; and James D. Moore, Specialized Services to Management, Chicago, Ill., on "A New Era in Labor Relations." Immediately following the morning session will be a meeting of the newly elected board of directors. No meetings have been scheduled for the afternoon, but the annual reception and banquet will be held in the evening.

Tuesday, June 9

Following a short business session, the program will be opened with a percentage-depletion symposium, which will consist of short talks by J. Milton Cooper, N.L.A. tax counsel, and Ralph L. Dickey, president, The Kelley Island Lime and Transport Co., Cleveland, Ohio, followed by a question-and-answer discussion with the N.L.A. tax committee. Other featured speakers will be Richard D. Hoak, senior fellow, Mellon Institute of Industrial Research, Pittsburgh, Penn., whose topic will be "Lime: Ubiquitous Neutralizing Agent"; William A. Parsons, research associate, Rutgers University, New Brunswick, N.J., on "Report on National Lime Association Trade Wastes Fellowship"; and Prof. Walter C. Voss, head of Department of Building Engineering and Construction, Massachusetts Institute of Technology, Cambridge, Mass., on "The Dangerous American Horizon." Again there will be no sessions held in the afternoon. The evening's entertainment will feature a Bingo party, with special prizes for the ladies.

Wednesday, June 10

The session will be opened with a speech by John C. Thornton, architect, The Detroit Edison Co., Detroit, Mich., on "Masonry Research Developments." Other topics to be discussed will include "Industry Safety Programs," by Ivan F. LeGore, manager, Accident Prevention Bureau, Portland Cement Association, Chicago, Ill.; "Report on National Lime Association Research Fellowship on Oil Wastes," by Prof. Don E. Bloodgood, Department of Sanitary Engineering, Purdue University, Lafayette, Ind.; and "Recent Developments on Lime Stabilization in Texas," by Chester McDowell, senior soils engineer, Texas Highway Department, Austin, Texas. The meeting will be adjourned at 12:00 noon.

Cement Plant Expansion

GENERAL PORTLAND CEMENT CO., Chicago, Ill., recently announced plans to increase its annual productive capacity to 13,000,000 bbl. with a construction and installation program scheduled for 1953-1954.

Annual capacity of type 1 portland cement was increased by 1,250,000 bbl. in 1952 when a fifth kiln and related facilities were placed in operation at the company's Tampa, Fla., plant. According to Smith W. Storey, president, capital expenditures for 1953 are estimated at $4,000,000 which will cover completion of additions at the Tampa plant, improvements at other plants, and the start of construction at the company's Houston, Texas, plant to increase its capacity by 1,250,000 bbl. per year. Expansion at the Houston plant is scheduled for completion in 1954. The company operates four other plants—two at Dallas and one at Fort Worth, Texas, and one at Chattanooga, Tenn.

Limestone Plant

TEXAS LIME CO. has been organized to operate the Limestone Products Corp. plant at Cleburne, Texas. President of the new firm is Louis R. Myers, operator of the Batesville, Ark., White Lime Co. Other officers include Dudley F. Woodbridge, vice-president and general manager; Mrs. M. S. Stokes, treasurer; Ray Anderson, secretary; and Francis McCorkle, assistant secretary. Production at the plant will include pulverized or quicklime, hydrated chemical and hydrate mason lime and agricultural limestone.

Texas Cement Production

THE TEXAS CEMENT INDUSTRY set a new production record in 1952. Preliminary figures show a production of over 20,100,000 bbl. of cement, compared with 18,305,000 bbl. produced in 1951, or an increase of over 10 percent.

A major contributor to the increased production was Lone Star Cement Corp.'s new $8,000,000 cement plant near Sweetwater, placed in operation late in 1951. Capacity of the 2-kiln plant was listed as 1,400,000 bbl. A third kiln, which is to be installed sometime this year, will increase capacity to 2,100,000 bbl. The company also operates plants at Dallas and Houston.

Trinity Portland Cement Division, General Portland Cement Co. expanded its facilities in Dallas in 1950, increasing capacity nearly 80 percent. The company also operates plants in Fort Worth and Houston.

Other major cement producers in Texas include Halliburton Cement Co., Corpus Christi; Gulf Portland Cement Co., Houston; Universal Atlas Cement Co., Waco; San Antonio Portland Cement Co., San Antonio; Longhorn Portland Cement Co., San Antonio; and Southwestern Portland Cement Co., El Paso.

Vermiculite Standards

THE VERMICULITE INSTITUTE, Chicago, Ill., recently announced that vermiculite plaster aggregate is now covered under the new A.S.T.M. specification C35-52T.

Under the new specification, the weight, or density, of vermiculite plaster aggregate ranges from a minimum of 7½ lb. to a maximum of 10 lb. per cu. ft. E. R. Murphy, managing director of Vermiculite Institute, emphasized the importance of a uniform aggregate and pointed out that all plaster aggregates processed by member companies of the institute must meet the new specification.

Reopens Quarry

MISSOURI VALLEY LIMESTONE CO. is reopening a quarry near Lewis, Iowa, formerly known as the Iranistan quarry. The company will produce road rock and agricultural limestone.

Gravel Plant

TEXAS CONSTRUCTION MATERIAL CO. is building a plant near Columbus, Texas, for the production of washed gravel and road gravel.

COMING CONVENTIONS

May 13-15, 1953—
National Industrial Sand Association, 18th Annual Meeting, The Homestead, Hot Springs, Va.

June 8-10, 1953—
National Lime Association, 51st Annual Convention, The Homestead, Hot Springs, Va.

June 12, 1953—
National Agricultural Limestone Institute, Directors Meeting, Edgewater Beach Hotel, Chicago, Ill.

June 12-14, 1953—
Concrete Products Association of Washington, Annual Summer Meeting, Monticello Hotel, Longview, Wash.

H H

Half-Track For Plant Use

AT A SLAG-PROCESSING PLANT, a half-track which has been provided with a boom and winch, is used about

Half-track, equipped with boom and winch

the plant for repairs and similar work. The unit is also used to spot cars at the loading bins. The ground surface at the plant consists primarily of crushed and sized slag which has little bonding material and rolls easily under standard truck wheels, but the half-track is said to serve quite satisfactorily.

Liquid Cyclones

LIQUID CYCLONES have been used in a number of sand and gravel plants with varying degrees of success. They are useful for recovering added fine sands and as a sand scavenger unit for other types of sand preparation machines but, to get desired results, they must be correctly installed and patterned for the job.

The capacity of a unit in tons of sand per hour is governed somewhat by the size of the outlet. It recovers the coarsest sand in the feed the easiest so, if over-fed with a blended mix, not much fine sand will be recovered because the outlet capacity will be filled by the larger sand particles. A better way is to get the plus 60 to 100 sand out by other methods, and then the liquid cyclone can perform its job more efficiently. The illustrations show three different installations:

Fig. 1 uses an old-fashioned molasses gate to control the pressure in the unit and to control the flow of sand from it. A vent-line on the discharge pipe from the cone lets in air and helps to control the sand discharge. Fig. 2 employs a rubber sleeve with a pinch-type clamp. The discharge is split into two fractions by an inverted "Y" so the fine sand can be better mixed with current production. Fig. 3 has no control valve at all, but has a discharge of wear-resisting material which is constant as to its diameter.

Cleaning Conveyor Belts

A PRODUCER who has encountered clay troubles to a minor degree has a practice of excavating under water and thereafter soaking the sand and gravel in transit and during processing. This meant that wet conveyor belts would have fines adhering to the under side of the returning belt. Older wooden conveyor galleries were

Vertical pipe in center carries spray water to disposal

replaced with steel ones. The upper one shown in the illustration has a long metal drain pan at the upper end that receives water which is sprayed on the under side of the belt to wash off the fines. The pan collects the spray water which is disposed of through the near-vertical pipe shown in the center.

Removing Loose Rock from Mine Walls

A NUMBER of mine and quarry operators reportedly have had remarkable success in removing loose rock from mine walls by the use of the Remington industrial gun, manufac-

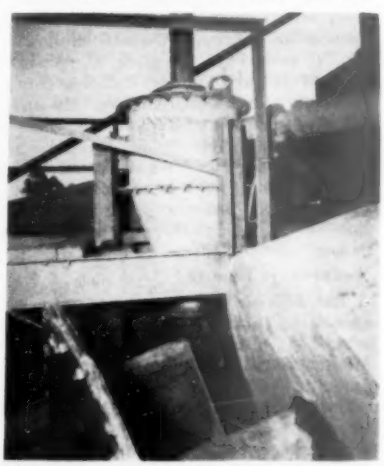


Fig. 1: Pressure and sand flow are controlled by old-fashioned molasses gate and air vent on discharge pipe. Fig. 2: Discharge is split into two fractions by an inverted "Y." Fig. 3: Air admitted in discharge (slime) line helps control unit

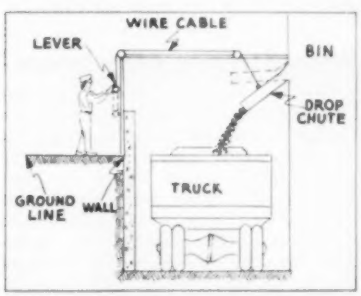
tured by Remington Arms Co., Inc., Bridgeport, Conn. It was also used by the Bureau of Mines for scaling roofs and walls at its Rifle, Colo., oil-shale test mine.

The gun, weighing 92 lb., is approximately 8-gage and is fired by a lanyard connected to a rotating sear, which releases a rotating hammer that strikes the firing pin. The gun is loaded with a 3-oz. lead projectile which is said to develop a muzzle velocity of more than 1600 ft. per second. Aiming is accomplished through open sights cut in the gun cradle or by bore sighting. According to the manufacturer, the muzzle energy at various distances is as follows: 50 yd., 5684 ft.-lb.; 100 yd., 4387 ft.-lb.; 150 yd., 3548 ft.-lb.; and 200 yd., 2987 ft.-lb.

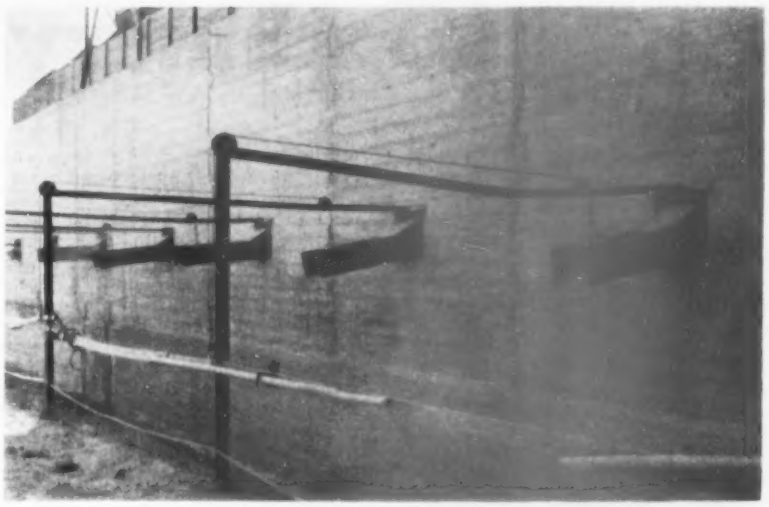
The gun in use at the Bureau of Mine's oil-shale mine is mounted on a war-surplus bomb-trailer and is said to be easily adjusted horizontally by means of a hand crank (traverse gear) and vertically by means of a hand wheel, so that it may be aimed quickly and accurately. The gun was used for dislodging overhanging icicles on the cliffs which menaced the safety of men and equipment. Large icicles were said to have been removed successfully at distances ranging from 50 to 200 yd. Protruding rocks on pillars at inaccessible places in rooms 50 ft. high were also removed. The gun is said to be most applicable in scaling areas where broken rocks on the floor prohibit the use of lift machines.

Truck-Loading Gates

SOME OF THE ROCK PRODUCTS PLANTS built within the past few years have depended upon a loading belt passing under bins to load cars and/or trucks. This permits blending but allows only one material to be loaded at a time and, if a bin gets full, the haulage loading system is tied up while emptying that bin. Auxiliary truck-loading facilities can be provided along the lines of the one shown in the illustrations. Alongside the concrete bins is a depressed truck-way. The truck to be loaded is spotted under one of the loading chutes. The loading operator is on the opposite side of the ramp but at an elevation that permits him to see what is going on. Each chute has a long, 2-in. dia. pipe hinged at one end. A cable connects the chute to about the middle of the 2-in. pipe. This permits ample leverage for raising or lowering the drop-chute gate which controls the flow of aggregate.



Sketch shows details of auxiliary truck-loading facilities



Pipe along rail serves as lever for operating truck-loading gates

Door and Loading Shelter

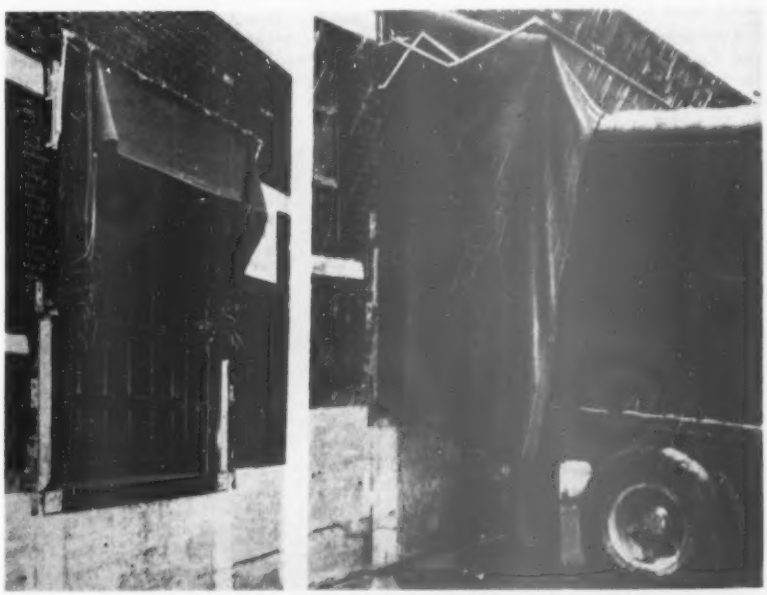
By PAUL C. ZIEMKE

THE ACCOMPANYING ILLUSTRATION shows how one company, during loading or unloading operations, protects its cargo against inclement weather conditions. A tarpaulin installed over the loading door achieves two results—provides an excellent cover over the truck bodies when rain or snow would ordinarily hinder speedy handling of perishable cargoes and, at the same time, provides a shelter against both rain and sun for the rather vulnerable folding-type door. A brushed-on preservative, applied every three years, helps to maintain both appearance and longevity.

In addition to protecting cargoes, use of the tarpaulin saves a considerable amount of fuel oil each winter when ordinarily the door stood wide open for extended periods.

■

BLAIR-ROUSH CORP. has started operation of its new ready-mixed concrete plant at Raleigh, N.C. Plant capacity is 800 cu. yd. of concrete per day. Milton Roush is president and Harry Blair is secretary-treasurer.

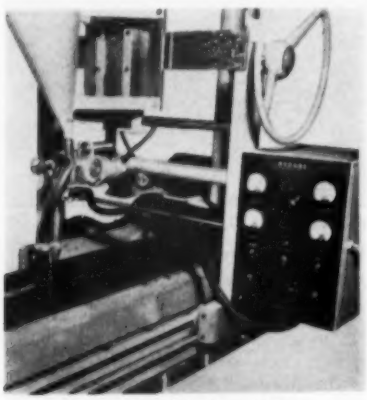


Left, folded tarpaulin over loading door; right, extended tarpaulin provides cover during loading or unloading operations

NEW Machinery

Automatic Welder and Positioner

SIGHT FEED GENERATOR CO., West Alexandria, Ohio, has introduced its Rexarc automatic welders and positioners, designed to replace hand welding operations. Provisions are included for low and high voltage welding and high frequency starting and stabilization. Removable head, vertically adjustable rotating spindle, hydraulically controlled elevating device, and supporting trunnions equipped with friction bearing rolls are additional features.



Automatic welder in operation

Box Car Unloader

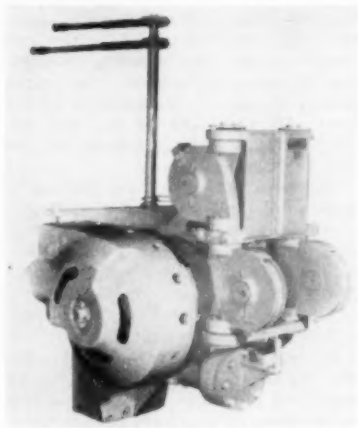
STEPHENS-ADAMSON MANUFACTURING CO., Aurora, Ill., has introduced its S-A box-car unloader which operates between two tracks to make it possible to move directly from one car to another on an adjacent track. The unloader is designed to handle sand, cement, and various bulk materials up to 2-in. lump size. A pantograph arm equipped with a scoop reaches into the car until it meets an obstruction, drops down and withdraws a load of material, discharging it to a track-side hopper. This cycle continues automatically with only one manual operation, that of directing the arm to different sections of the car. The unloader measures 8 x 24 ft. when it is not in operation and requires a single concrete footing for track-side mounting.

Hard-Facing Alloys

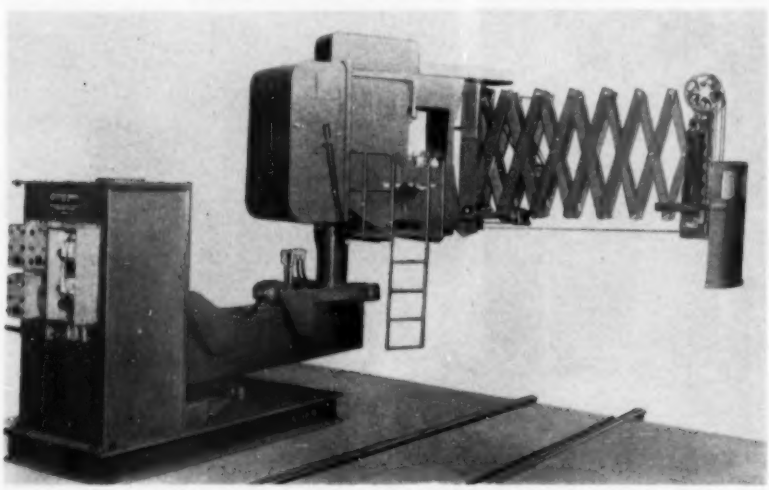
COAST METALS, INC., Little Ferry, N.J., offers a hard-facing alloy CM-199 which is said to weld over itself and more ferrous materials without cracking, checking or porosity. Its abrasion resistance makes it economical both for hardfacing and subsequent rebuilding. It can be applied with the arc welding process.

Cable Control Unit

WOOLDRIDGE MANUFACTURING CO., Sunnyvale, Calif., has announced an extra heavy-duty, cable-control unit, especially designed for use with tractors of 130 hp. or more. Designated as the Wooldridge Model WD-2, it employs a simplified power train comprised of one worm gear and wheel. Double drums of 10-in. barrel diameter are actuated by multiple disc clutches and self-energizing brakes, and are said to provide fast, smooth action under all operating conditions. Universal fairleads and large sheaves are claimed to provide longer cable life and easier reeving. Anti-friction tapered roller and ball bearings are used throughout. Line speed at 1000-r.p.m. input is rated at 343 ft. per min. with bare drum, and 542 ft. per min. with full drum. Each drum has a cable capacity of $\frac{1}{2}$ in. x 235 ft. or $\frac{9}{16}$ in. x 186 ft.



Heavy duty cable control for use with tractors of 130 hp. or more



Unloader to handle bulk materials to 2-in. lump size

Lithium Grease

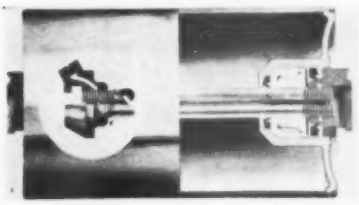
SHELL OIL CO., 50 W. 50th St., New York 20, N.Y., has developed a lithium base product called Alvania multipurpose grease. The grease contains lithium 12-hydroxy stearate which is claimed to give a high mechanical stability to the product. The manufacturer claims the following advantages and features for the grease: high water tolerance; broad temperature range; ability to achieve high pumpability and movement at low temperatures, undergoing no phase change as temperature rises to the high melting point; low rate of oxidation and long induction period; excellent storage stability; and adaptability to extreme water conditions.

Power Steering Attachment

BEHLEN MANUFACTURING CO., Columbus, Neb., has developed a power steering attachment, used primarily on tractors with center-steering shafts and hydraulic units. The power unit consists of a fluid pump driven off the tractor engine with an hydraulic gear motor converting the fluid pressure into mechanical torque. Shocks due to rocks, planks, rough terrain, etc., are said to be absorbed by the attachment.

Belt Conveyor Idler

CONTINENTAL GIN CO., Industrial Div., Birmingham 2, Ala., has placed on the market a new type unit-sealed,



Cut-away sections to show details of idler

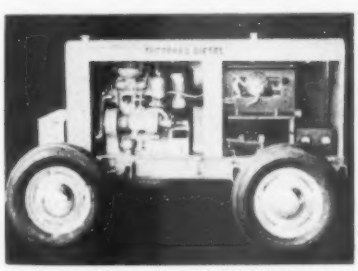
prelubricated, Timken bearing belt conveyor idler designed to operate for extended periods of time without relubrication. The unit bearing assemblies provide an ample grease reservoir which, it is claimed, eliminates any possible migration of the grease from upper to lower bearings on inclined rolls. The idler has been designated Type "UST."

Portable Crushing Plants

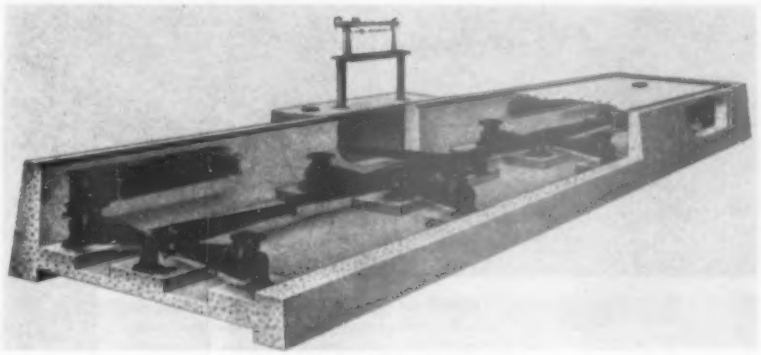
DIAMOND IRON WORKS, INC., 1748 N. Second St., Minneapolis 11, Minn., has introduced three portable crushing plants, the "100 Series," with 30 to 70 t.p.h. capacities. Designed for use where mobility is important, the unit has a short wheel base and specially positioned towing tongue to aid maneuvering on the road or in the pit. A 10-ft., 4½-in. hopper; hinged delivery conveyor to eliminate dismantling for towing; and adjustable single eccentric plate feeders are included among its features. The plants also have guarded drives and an operator platform which is said to permit access to power units and a full view of operation. Gasoline or diesel power can be provided.

Portable Arc Welders

R. H. SHEPPARD CO., Hanover, Penn., has announced a line of portable arc welders, powered by diesel engines. The welder, of 200-, 300- or 400-amp. capacities, including the engine, is 45⅝ in. high, 27½ in. wide and 63½ in. long on skid base. Featuring multi-V belt drive to allow generator speed up to 3500 r.p.m., the models are available on four-wheel trailers or steel I-beam bases.



Diesel-powered, portable arc welder



Industrial truck scale with 50-ton capacity

Motor Truck Scales

THE HOWE SCALE CO., Rutland, Vt., has brought out a line of motor truck scales for use in weighing big truck and trailer loads. High strength iron is used for the scale castings and a scientific- straight-lever design is used to obtain optimum strength with the least weight. A ball-bearing feature is said to save wear on knife edges and bearings, while anti-friction plates are used to give proper clearances and to eliminate lateral motion. The scale has a 50-ton capacity and platform sizes of 45, 50 or 60 ft. long and 10 ft. wide.

Front Dump Shovel

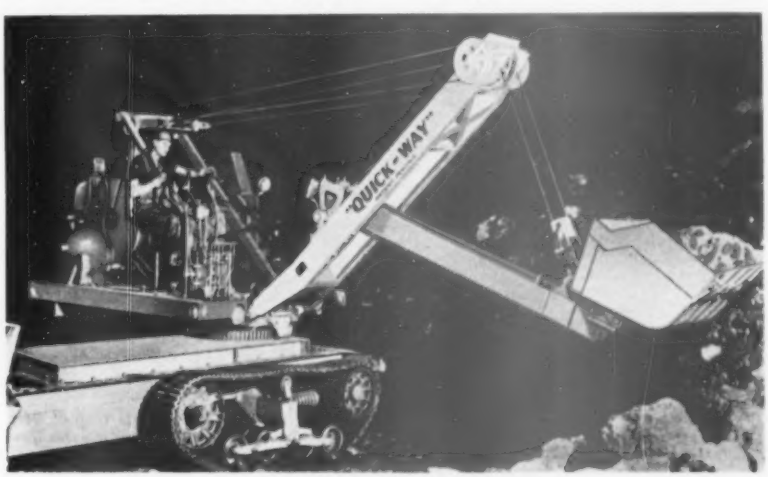
"QUICK-WAY" TRUCK SHOVEL CO., Denver, Colo., has developed a front dump shovel for handling large rocks and material which will not easily dump through a conventional shovel bucket. The full revolving model "L" was especially designed for underground work in mines where low overhead clearances and maximum dumping heights are required, and is powered by a diesel engine with exhaust scrubbers, for underground work. The front dump, ⅝-cu. yd. shovel attachment is cable controlled, equipped with an automatic cable crowd utilizing rack and pinion on twin dipper sticks. A similar attachment is also available for mounting on any standard model "L" unit for quarry work.

Alloy-Coated Electrode

STOODY CO., Whittier, Calif., recently marketed an electrode, the Stoody Build-Up, designed to produce an alloy steel deposit of consistent medium hardness of 29-31 Rockwell C under normal conditions. The purpose of the extruded alloy-coated electrode is to rebuild steel parts preparatory to a hard-facing overlay. Its deposits are said to be machinable with high speed tools.

Electronic-Controlled Drives

GENERAL ELECTRIC CO., Schenectady 5, N.Y., has added a simplified drive to its line of Thy-mo-trol electronic adjustable-speed drives. The unit is available for ¾- to 3-hp. drives with speed ranges of 5:1 and 20:1. Its motor is claimed to accelerate to and hold any pre-set speed with a 3 percent allowance either way while operating on 220/440 volts, single-phase 50/60 cycles.



Low head-room shovel in action

Addition of the deflocculating agent, sodium tripoly phosphate, which reduces the percentage of water and still retains pumpable viscosity of shale slurry, results in an average water content of 37 percent in the slurry in this kiln feed basin compared to a previous average of 40 percent. That much less water is present for the kilns to remove

By JOHN ROMIG* and BRUCE KESTER†

THE OLD CLICHE about necessity being the mother of invention certainly held true during early operation of the modern 6500 bbl./day wet process addition to the St. Louis plant of Missouri Portland Cement Co. in 1950.

As the two new 450-ft. kilns started rotating, no more than the usual operational "bugs" were encountered and remedied. But after a few months of operation, a bottle-neck in the passage of slurry between mill and kiln feed brought about an unusual problem.

How that problem was answered without any major structural changes and the future implications of this process technique which further research and testing may show to be feasible is felt worth reporting to the cement industry. The nearly two years of successful use of the system is adequate testimony as to soundness of the technique.

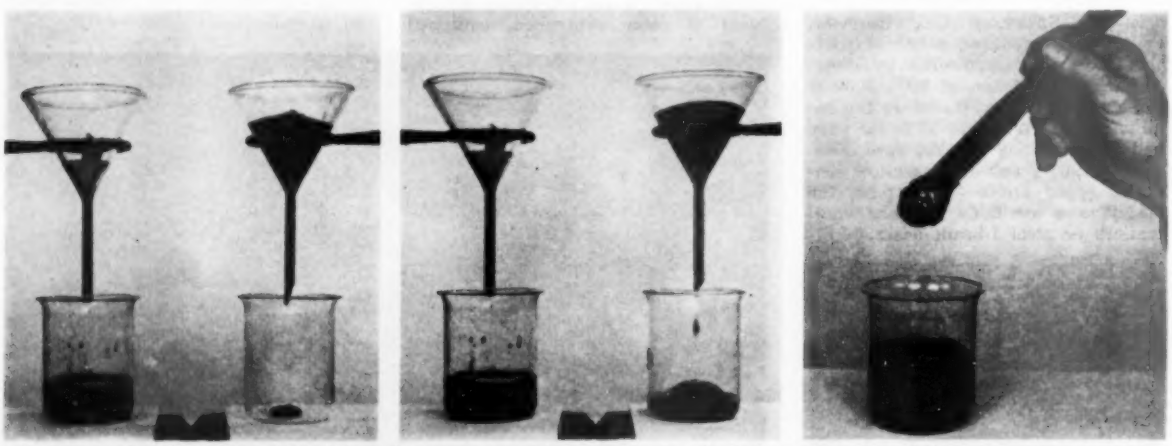
It is fully realized that different raw materials or operating conditions in other plants might call for variations, but it is believed that the technique for control of slurry viscosity is one of the more important advances of recent years in cement production.

Details of the new Missouri Portland wet process plant were described originally in ROCK PRODUCTS, August, 1951, so all the plant details will not be repeated. Only those parts of the process having an immediate bearing on the problem will be mentioned. In the initial stages of the plant's operation, the grinding of both the shale and limestone was by the two Nordberg mills close circuited with a Dorr rake and bowl classifier. The roughly proportioned shale-limestone slurry was then pumped into the two Dorr thickeners operated in parallel.

Right at this point is where the problem developed and these three factors became increasingly apparent:

1. The shale, due to an ultimate finer particle size, did not settle out in the thickeners at an efficient rate.
2. The slurry had to be maintained with a higher percentage of water than was desirable in order to maintain it at a pumpable viscosity.
3. The slow settling and necessary higher water content limited capacity of the thickeners to a point below kiln capacity.

Chemical engineer* and research chemist†, Missouri Portland Cement Co.



Left: Seconds after identical quantities of shale slurry were poured into the glass funnels. Both samples contained 42 percent water. The one on the left contained sodium tripoly phosphate at a 0.3 percent rate. Center: A few minutes later all the sample of shale slurry containing STP had run through, and only an occasional final drip of material kicked up a "splash" on the side of the beaker. The sample on the right is so thick it would present serious pumping problems. Right: Gypsum accidentally mixed with the shale raw material produced a "gummy" problem—illustrated with 0.5 percent gypsum milled with the shale. Increasing the STP concentration is the most effective treatment found so far

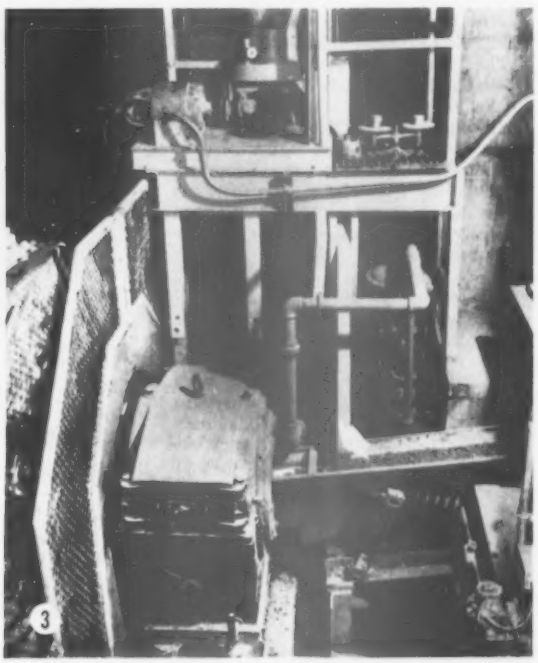
Additive Solves Problem

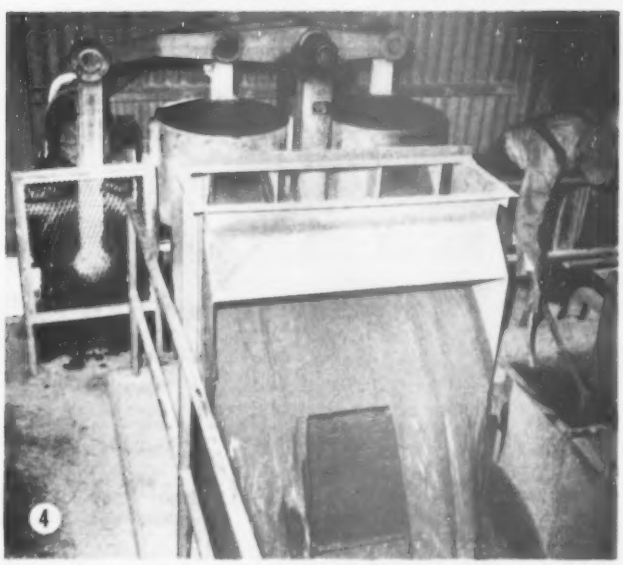
Considerable screening and research on deflocculating agents had been conducted earlier by Ralph Striker**. He had evaluated many different compounds. Several were found to effectively reduce the necessary proportion of water to solids in the slurry, but most had to be ruled out because of the cost. The one best meeting all criteria was sodium tripoly phosphate, and today it is an integral part of the operation. Sodium tripoly phosphate has the chemical formula $Na_5P_3O_{10}$ and is commonly referred to as STP. As time permits further research, it appears possible that STP may have even further application. New products and types of deflocculating agents are being constantly checked and evaluated by our research department to insure the validity of the slurry control system.

Economically, the use of this additive means perhaps no more than one-half cent per barrel of cement. This is more than offset by the advantages of greater capacity through the Dorr thickeners, and in heat saving since there is less water to remove in the kiln.

Chart 1 shows the flow of materials as well as step-by-step approximate water-solid proportions, which have been achieved. At the present time,

**Now Assistant superintendent and chemical engineer, Missouri Portland Cement Co., Independence, Mo.





Steps in handling sodium tripoly phosphate into slurry: (1) Sacks of STP being loaded into cart at the St. Louis, Mo. plant of Missouri Portland Cement Co.; (2) cart can be raised by crane so that it can be fed into the supply bin of the table feeder which is located on a special platform at the feed end of Unidan mill; (3) small chute (arrow) feeds the small quantity of STP to the stream of shale raw material as it feeds into the mill (normal feed is 0.15 percent by weight, but it may be easily changed to meet changing raw material conditions); (4) diaphragm pumps draw off limestone slurry (stream at left) from the thickeners while approximate quantities of shale slurry are added through the small bin at right from which the material goes to mixing basins where final quality control check is made before transferring the slurry to the kiln feed basin

STP is added only to the shale which is ground separately from the limestone. The limestone is ground at a ratio of 80 percent water—20 percent solids to the Dorr thickeners. It is withdrawn from the thickeners at 36 percent water.

The shale is processed in a 7x39 ft. Unidan Mill which was originally intended for sole use in processing correctives such as lime, shale, iron, etc. Since the kiln-feed mixture consists of approximately 85 percent limestone slurry to 15 percent shale slurry, the Unidan is adequate to process the shale tonnages presently required.

The finer particle size of shale which had previously restricted the thickener capacity, now created an additional problem. Without STP, the shale slurry had to be maintained at 55 percent water in order to pump it. Even at this high water content when the slurry was contaminated with loess clay or gypsum it became unpumpable. With the addition of STP it was possible to reduce the water content to 40 percent and, except in cases of major contaminations, to maintain pumpability. Like so many correctives in process industries, while a little additive is very effective, excesses of STP are as dangerous as using no STP. Extremely rapid settling of the shale slurry occurs when STP is added in excess of 0.5 percent except where contamination has occurred. Then the excess is needed to overcome the thickening occasioned by the contamination.

Initially, STP was added to the shale in liquid form with a reagent feeder. This proved inefficient for control purposes, and a Robbins table feeder now serves adequately, using STP as it comes from the manufacturer. It sprinkles STP at 0.15 percent by weight of solids on the stream of shale as it enters the feed end of the Unidan. Due to the position of the feeder, it does not interfere with processing of other materials in the Unidan, and the supply of STP can easily be cut off at those times.

Incidentally, so that the STP can be handled by machine as much as possible, a special cart with dump spout was designed. Several bags of the STP from the working supply stored on the lower floor of the mill building can be dumped in the cart, elevated by crane, and dumped in the bin of the Robbins feeder.

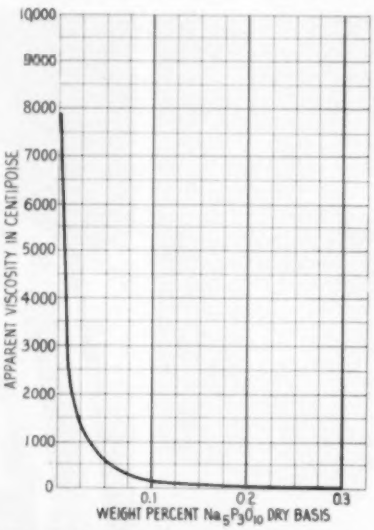


Fig. 1: Showing effect of varying amounts of STP on shale slurry tested with viscometer

Contamination Factors

By experiment, it was found that two contamination factors must be watched continuously while processing shale slurry. First, an increase in the percentage of clay in the shale makes it necessary for the operator to increase the proportion of STP. Secondly, the shale must be carefully watched for gypsum which may have become accidentally mixed with the shale. Tests have indicated that the gypsum is a trouble maker for the slurries. The effect of the accidental gypsum contamination in thickening shale slurries is extremely pronounced even with almost trace amounts of gypsum. This gelation occurs even with the normal additive amounts of STP. While the actual mechanics are unknown, gypsum contamination inactivates deflocculants such as STP when present during shale grinding.

No completely successful treatment of such contaminated shale slurries has been found. However, the most effective correction found to date has been merely to increase the amount of STP, using as high as 0.4 percent. In evaluating the effectiveness of STP, or of any consistency control additive, the factor of possible contaminating agents must be recognized and considered.

Fig. 1 is a graph showing the effect of varying amounts of STP on our shale slurry, as tested with a Brookfield viscometer, Model LVF with a range of 0-100000 c.p.s. It should be remembered that the numerical values given as viscosity in centipoises are relative only, and that the magnitude of an apparent viscosity of an anomalous fluid is dependent upon the conditions of measurement and is not a physical constant of the fluid. Other tests conducted by Monsanto Chemical Co.'s research department with the Stormer viscosimeter, using the standard cup with baffles and annular cylindrical rotor, produced an almost identical curve as shown in Fig. 2. The comparative curves attested to

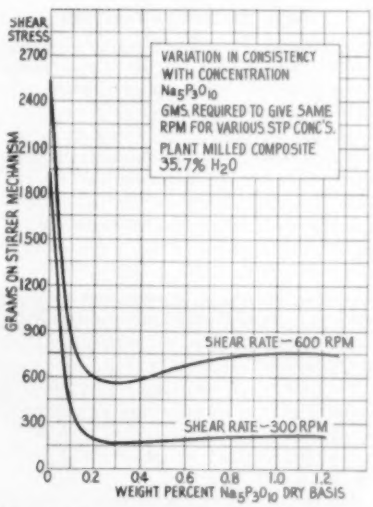


Fig. 2: Shows the increase in shear stress with an increase of STP concentration above 0.3 percent

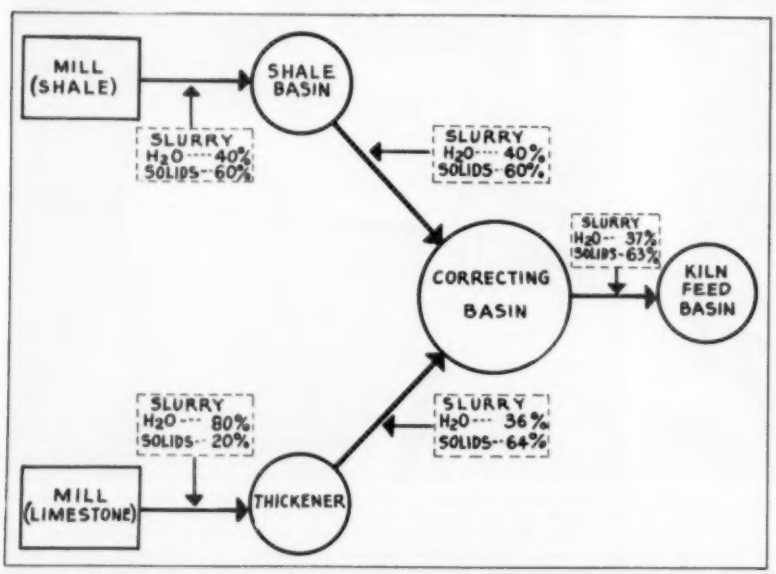


Chart 1 shows the flow of materials and step-by-step approximate water-solids proportions

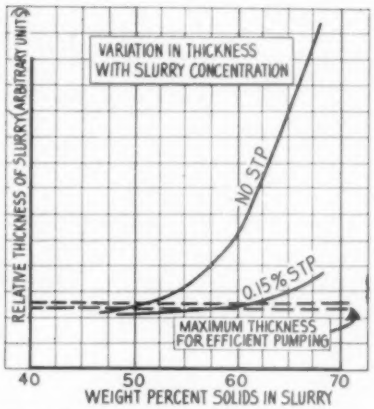


Fig. 3: Graph showing variation in consistency of shale slurries with and without STP

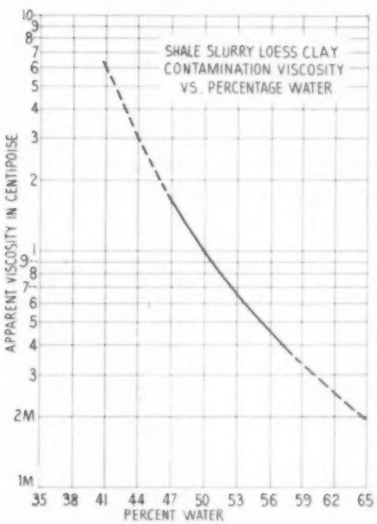

SHALE SLURRY LOESS CLAY CONTAMINATION VISCOSITY VS. PERCENTAGE WATER
APPARENT VISCOSITY IN CENTIPOISE
PERCENT WATER
35 38 41 44 47 50 53 56 59 62 65

Fig. 4: Graph showing how viscosity of shale slurries is increased by the presence of loess clay contamination

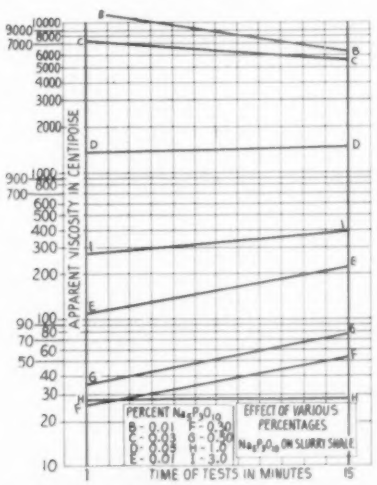


Fig. 6: Shows effect of a wide range of percentages of STP added. From this data it is possible to predict the desired amount of STP for production grinding

the accuracy of each laboratory's findings. Fig. 2 shows an increase in shear stress with an increase of STP concentration above 0.3 percent. This data was confirmed by findings in our laboratory, but since the data was obtained on different samples it is not included in Fig. 1. Figs. 3, 4, 5, and 6 shows some of the other factors the consideration and use of sodium tripoly phosphate has revealed.

During the two-year period the system has been used in the new portion of the Missouri Portland plant, it has been determined that the usual pumpability limit corresponds to a reading on the Brookfield viscometer of about 4000 centipoises.

Fig. 3 shows the variation in consistency of shale slurries with and without STP as a function of solids concentration. The decrease in thickness upon treatment with STP is clearly shown, as is the variation in water content of treated and untreated slurries adjusted to the maximum permissible thickness for pumping.

As shown by Fig. 4, the viscosity of shale slurries is drastically increased by the presence of loess clay contamination. Rather than correct for this contamination by increasing the water content, it is possible to control viscosity at pumpable limits by minor increases in the STP feed rate.

Fig. 5 demonstrates that even though varying percentages of STP are added, no significant change in viscosity which would affect pumpability takes place upon aging of the slurry. This has been found to be true on either quiescent or agitated aging over 48 hours.

Fig. 6 shows the effect of a wide range of percentages of STP added. From this data it is possible to predict the desired amount of STP for production grinding.

From the Unidan, the shale slurry is carried at 40 percent water to solid ratio and stored in one of the basins in the blending tank area next to the Dorr thickeners. Then as basins of the shale and limestone are mixed and tested for proper blend prior to transfer to the kiln feed tank, the problem works out in somewhat this manner:

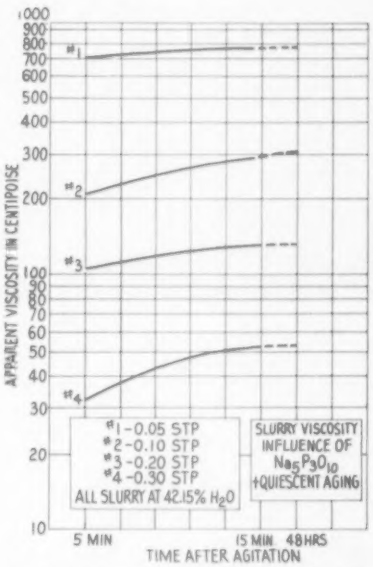


Fig. 5: Demonstrates that even though varying percentages of STP are added, no significant change in viscosity which would affect pumpability takes place upon aging of slurry

BEFORE	AFTER
Shale slurry with No STP required at least 55% H_2O	Shale slurry with 0.15% STP required only 40% H_2O
added to	added to
Limestone slurry pumpable with 36% H_2O	Limestone slurry pumpable at 36% H_2O
Giving an average kiln feed ratio of 40% H_2O	Giving an average kiln feed ratio of 37% H_2O

The volume of water thus removed before the slurry enters the kiln is obvious. Also the previously limiting capacity of the thickeners has been eliminated.

While reduction of water content appears minor and thickener capacity of no concern on open-circuit systems, perhaps the most pertinent value obtained from the use of STP has been the virtual elimination of plugged lines and pump failure from thick slurry.

Use of the STP, coupled with a constant and a careful quality control check system, has given sufficient operating data to quickly adapt the process to any changing condition encountered with the particular raw material.

Details of the various proportions of STP to raw materials vary in normal operation, and will not be reported as it is felt they might not be applicable elsewhere.

Adaptation of this idea by other manufacturers appears to be entirely feasible after a thorough study of the exact materials in use. Possible benefits would include increased raw grinding efficiency and low water contents with attendant kiln economy. The pumpability and mechanical handling of slurries can be improved by the proper use of additives, of which STP appears to be one of the most effective. Slight variations from the raw materials herein reported might be just enough to cause great differences in results. But study of conditions should reveal exact percentages of additive for any given situation.

•

THE RECONSTRUCTION FINANCE CORP. has approved a $73,200 loan for Prince George Sand and Gravel Co., Laurel, Md.

INCREASE SAND AND GRAVEL CAPACITY
Sell Diversified Line of Products

Seated is J. K. Jensen, president; standing, left to right, J. R. Jensen, vice-president and superintendent; Fred Ehrlinger, secretary; and Ellis Jensen, treasurer

By RALPH S. TORGERSON

Janesville Sand and Gravel Co., Janesville, Wis., celebrates completion of plant expansion and office modernization program with Open House invitations to dealers, contractors, public and employes' families

TO CELEBRATE the completion of an expansion program, the Janesville Sand and Gravel Co., Janesville, Wis., had its first Open House on April 16 to which nearly 200 lumber dealer representatives were invited to inspect the new facilities. A smorgasbord luncheon also was served. This event will be followed by three others to which contractors, the public, and finally the families of all employes will be invited.

The expansion program includes the new No. 5 sand and gravel plant, about 1½ miles from the office, modernization of No. 4 plant, the installation of two new Gocorp block machines with a capacity of 26 standard block per minute, an increase in warehouse facilities, and the enlarged and modernized office. The company also is a large producer of ready-mixed concrete.

Founded in 1907 as the Janesville Cement Shingle Co., the company was incorporated under its present name in 1910 when the business had been largely converted to the production of sand and gravel. The company has pioneered in the use of machinery, having developed a paddle-type loader which was used in connection with cotton duck belts before rubber belting came into general use. Steam shovels were used as early as 1912. Its earliest operations were carried on with manpower and horsepower, consisting of 34 horses.

The sand and gravel deposit is considered one of the finest in the United States with its almost uniform gradation of 35 percent gravel and 65 percent sand without any clay or other deleterious materials. It is a glacial deposit now being worked to the water table or a depth of more than 90 ft., but it is estimated that the total depth of the deposit is 450 ft.

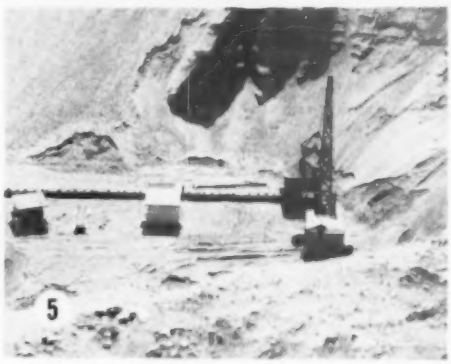
Sand and Gravel Operations

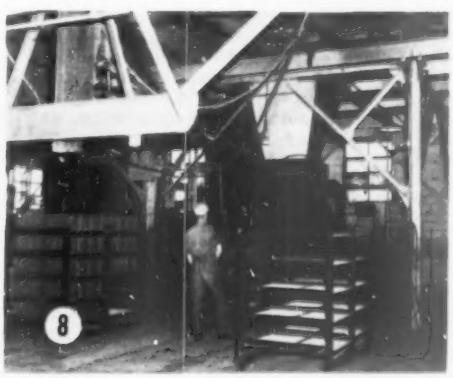
With the addition of plant No. 5, the capacity at each plant is about 350 t.p.h., or an annual capacity exceeding 1,100,000 tons. The overall design of the No. 5 plant is very similar to the No. 4 plant. The 26-in. conveyor belt from the point of excavation in the pit to the No. 5 plant is 500 ft. long in three sections. This is only about one-fifth the length of the belt conveyor at the No. 4 plant which has been in operation since 1920.

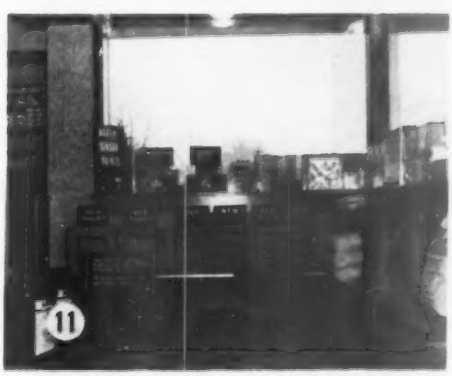
In the pit at the No. 5 plant, a Northwest crane with 1¾-cu. yd. Owens clamshell dumps to a hopper over the conveyor belt which carries the material to a rotary scalping screen. Oversize material goes to a short conveyor belt which conveys material to another rotary screen in the crusher building equipped with a No. 530 Allis-Chalmers secondary gyratory crusher and a McCully primary gyratory crusher. A second McCully gyratory is available for stand-by service. It is planned to install a fourth McCully so that a complete stand-by crushing capacity will be available. Throughs from these crushers are returned to the belt from the pit. Throughs from the scalping rotary screen at the dry screening plant go to the boot of a bucket elevator which discharges to four rotary screens in the dry screening plant to produce ballast and three other sizes of gravel. During the summer, gravel is washed at the dry screening plant, principally to remove sand particles.

Fines from these screens go by chutes to a long conveyor belt inclining up to the top of the wet screening plant where water is added from a pipe line laid to a pond in the pit. The pump house is equipped with a 5X4-SKH Allis-Chalmers electrically-driven pump. There is also an auxiliary 4X-3 CW solids pump in the wash plant to permit reuse of the water. Material is first discharged to a 4- x 12-ft. Allis-Chalmers Ripl-flo double-deck screen with the oversize going to a 3- x 6-ft. Allis-Chalmers

View of ready-mixed concrete and block plant







Plant operations of Janesville Sand and Gravel Co. (1) New No. 5 sand and gravel plant with wet screening unit in the foreground, dry screening unit in the background with crushing plant and shop building to the left; (2) scale house and plant superintendent's office, to the left, dry screening plant in the center, and electrical distribution building, to the right; (3) three gyratory crushers which return crushed oversize to the primary conveyor belt from the pit; (4) Stripping is done with a 1½-cu. yd. dragline and tractor equipped with end-loader; (5) a crane with 1¾-cu. yd. clamshell loads hopper feeding conveyor belt in pit; (6) showing pump house that supplies screening plant and conveyor inclining up to plant; (7) ready-mixed concrete plant with sand and gravel plant No. 4 in the background; (8) two new high-production block machines; (9) block plant with part of the large storage yard; (10) bulk cement unloading equipment and bin; (11) a display of concrete products in the new retail store and order-taking department; (12) order-taking department with some of the hardware items on display

Garage where all the automotive equipment is serviced and repaired

Aero-vibe single-deck screen which produces a roofing or pea gravel Throughs pass to two sand drags which produce torpedo and masons sand. Four large steel bins are used for live storage from which railroad cars are loaded. The bins hold No. 4 and No. 6 gravel, and torpedo and masons sand. The No. 6 is a 1- x ⅜-in. material, and the No. 4 is minus ⅜ in. Nearly all sand and gravel is shipped by rail over Chicago & Northwestern Railroad tracks. Cars are spotted under the bins at the dry and wet plants by electrically-operated winches. The No. 5 plant has processed 52 cars of material in 8 hr. at full capacity. There is also a machine shop at plant No. 5 where repairs can be made to all machinery on the first floor, and a woodshop is located on the second floor.

Stripping is done with a 1½-cu. yd. Northwest dragline and a D4 Allis-Chalmers tractor with end-loader. Some of the large size material after initial stripping is transported by truck and dumped over a scalping grid with the throughs going to the primary belt conveyor for processing in the dry plant.

Concrete Block and Ready Mix Plants

As the concrete block plant and ready-mixed concrete operations were described in considerable detail in ROCK PRODUCTS, November, 1950, page 116, a description of these operations is not included. One of the interesting features of this operation is the very large block storage capacity. Nearly 1,000,000 concrete block may be stored in the large concrete paved storage area. After steam curing, sufficient outside storage capacity is available so that block are not generally shipped out to customers until they have been subjected to outside curing for a period of about two months. This large storage capacity also helps to balance production so that during the construction season, block will be available when demand exceeds production. Production in 1952 exceeded 2,400,000 units, and eventual production is expected to reach 3,000,000 units. Distribution through nearly 200 lumber dealers has been very largely instrumental in expanding the market for block. At present about four out of five block are of sand and gravel aggregate with the remainder of Waylite aggregate. In this market area, there continues to be a large demand for block for basement walls. Ready-mixed concrete production has been increased to 44,000 cu. yd. in 1952.

The warehouse, which was built in 1949, with a capacity of 7,500 sq. ft., has been expanded an additional 2500 sq. ft. to accomodate a complete line of hardware, except lumber, including steel doors, fire doors, basement windows, steel lintels, steel columns, steel reinforcing mesh as well as such items as glass block, plasters, vermiculite, white cement, etc. To facilitate handling, all products are on pallets.

A modern garage provides equipment for the complete overhauling of all automotive equipment. At the present time the company is operating eight shovels and 33 trucks of various types.

Near the garage alongside the railroad siding is the cement storage bin. Bulk cement is dumped to a track-hopper and moved by a short belt to a bucket elevator for discharge into the bin. About 200 cars are unloaded annually. At a nearby concrete platform next to the siding another 200 to 300 cars are unloaded each year. These cars bring in aggregate for Waylite block, plaster, bag cement, steel, glass block, etc.

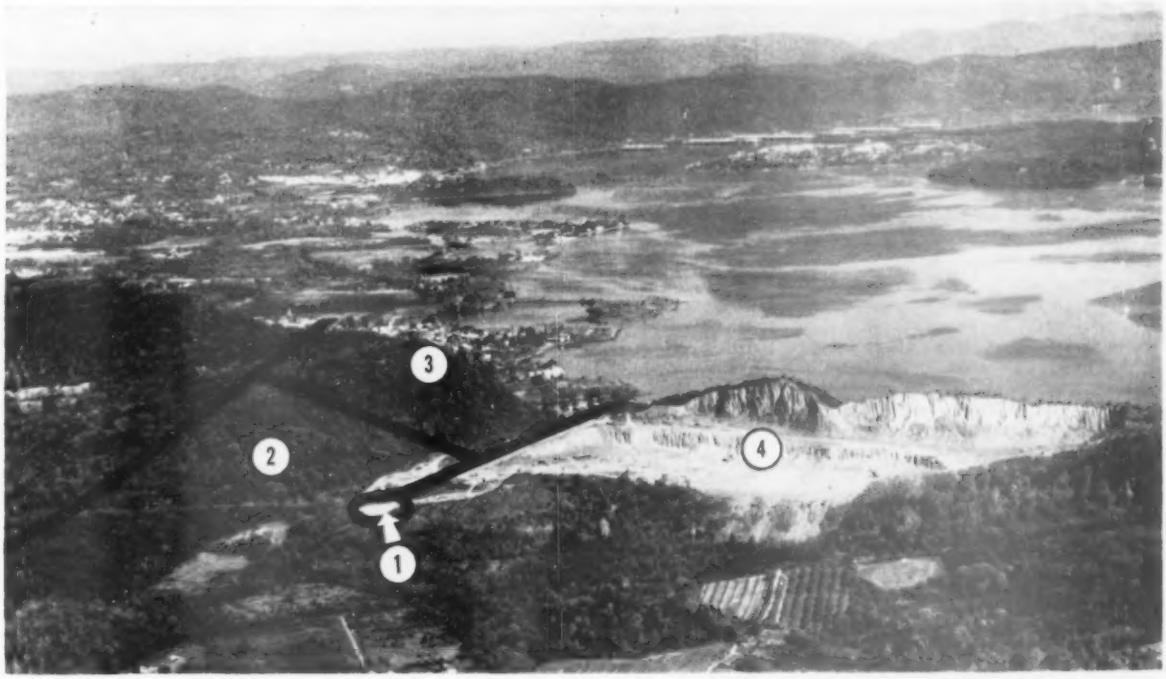
The addition to the office building includes a retail store and order-taking department at ground level. Customers may conveniently assemble the materials they need without multiple stops and parking worries. The order department is designed to eliminate constant movement between desk and counter. A room near this area is available for private customer conferences where building plans and ideas may be discussed.

Modern Office

Modernization and expansion of the office building has provided necessary conference rooms, luncheon facilities for office personnel and space for expansion. An Executone inter-communication system has been installed which permits office personnel to communicate rapidly with each other and with various buildings widely scattered on the property. A Trane air-cooling system has been installed to

(Continued on page 90)

Looking down at warehouse, to the left; large concrete-paved storage yard for block, and concrete block plant in foreground. These operations are located in the area which has been excavated to supply material to the older No. 4 sand and gravel plant



Aerial view of Haverstraw quarry. (1) Location of new crusher and quarrying operation; (2) area which was re-zoned to prohibit quarrying operations; (3) unrestricted area where company may be forced to quarry should ban be continued in restricted area; (4) face of present quarry. Side facing Hudson River has been left untouched

Moving Large Crushing Plant

New York Trap Rock Corp., transporting crushing plant at Cold Spring to expanded quarry operation at Haverstraw

NEARLY $1,000,000 will be spent by New York Trap Rock Corp. to dismantle the crushing plant and equipment at Cold Spring and transport it across the Hudson River to a new location for an expansion of operations at the present Haverstraw, N.Y., quarry. The Nicholson Co. has a contract for $600,000 to dismantle the Cold Spring crushing plant, move and re-erect it at Haverstraw, and another $250,000 will be spent for new machinery and steel which will be installed by the contractor.

Wilson P. Foss, III, president of the New York Trap Rock Corp., in commenting on the work, said that the major problem is the handling of the 175-ton jaw crusher, one of the largest ever built. Moving the crusher by scow across the river would have been the shortest route, but shoring operations on both sides of the river would be costly and time-consuming. It was therefore decided to dismantle it and transport the parts on a trailer and truck them down to and across the George Washington Bridge and then up to the quarry operations at Haverstraw over routes 9E and 9W. Although the Bear Mountain Bridge is nearer Cold Spring, it could not handle the load imposed by one of the parts which weighs 39 tons.

Wilson P. Foss, III, at controls of shovel as ground-clearing starts at new quarry plant

Two smaller crushers, 2428 ft. of conveyor belt, over 2000 cu. yd. of concrete and some 300 tons of steel will be needed at the new site, in addition to the 175-ton crusher and other facilities which will be moved from Cold Spring.

The project started in March and will require several weeks to complete the moving of equipment. A total of eight months will be needed for the erection of the new crusher facilities to tie in with the flow of material from present Haverstraw operations.

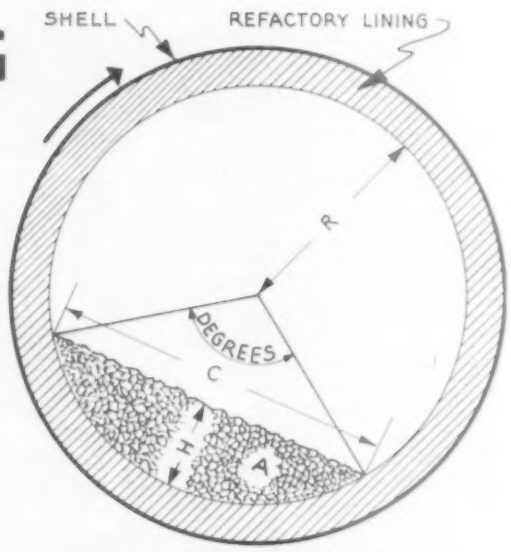
A problem has arisen with respect to zoning. Mr. Wilson has pointed out that the company has followed a definite quarrying plan to preserve the scenic beauty of the Hudson. It has always refrained from quarrying the river face of the Palisades, although there is a tremendous quantity of the company's stone-bearing land involved. However, the zoning of the company's land in Clarkstown, lying north and west of the present quarrying operations, to prohibit the quarrying of that area endangers the company's long-established conservation policy. "The needs of the construction and road-building programs for crushed stone," he said, "will require either removal of the restriction on the zoned land or the possible necessity of quarrying still further east and working the face of the Palisades.

Lee Fox on platform above 175-ton crusher

ROTARY KILN LOADING

A useable formula for determining flow of material in a rotary lime kiln

By IRVING WARNER*



A = AREA OF SEGMENT

Cross section of rotary kiln showing factors which are used in formula for determining flow of material

IN 1927, THE BUREAU OF MINES issued Technical Paper No. 384, entitled, "Passage of Solid Particles Through Rotary Cylindrical Kilns," wherein it was shown, among other things, that the rate of travel of a charge through a rotary kiln is proportional to the slope and the diameter. (An abstract of this paper was published in ROCK PRODUCTS at the time.)

An excellent piece of work was done in determining the experimental data and deriving the mathematics therefrom. But unfortunately, being a scientific treatise, the results were not presented in suitable form for ready use. Herein, I am endeavoring to make an interpretation of the essence of this work so it can be a practical tool useful to the plant engineer, superintendent or even the boss himself.

On the first page of the paper, was given the formula derived from the work. It is somewhat elaborate, but the average reader need not be scared since it involves no higher mathematics. Furthermore, I consider it is not in useable form, so I have simplified it to a useful form for the practical operating man and the young engineer.

As given, the formula is:

$$t=\frac{1.77\ L\ \sqrt{\theta}}{pdn}$$

Wherein:

- t = time in the kiln in minutes
- L = length in feet
- p = slope of kiln in degrees
- d = diameter, inside of lining, in feet
- n = revolutions per minute
- θ = angle of rest of the material

Note: The formula in the paper has a "factor" for constrictions. This factor is 1, for a cylindrical kiln and therefore omitted.

The only value of the formula in this form is to give the length of time for the charge to pass through the kiln. This is of interest but of little practical value. The useful form is to know how far the charge advances per revolution of the kiln. Such information can be useful.

We will first get rid of θ. This is the angle of repose for any pile of limestone such as is fed to the kiln. It varies slightly and 36 deg. is as good as any, so the $\sqrt{36}=6$. Note that the cement manufacturer having a dry process kiln, must get his own value of θ which is low for a pulverized, raw feed.

Eliminating time, length of kiln and revolutions per minute, we get the simple formula:

$$L=\frac{pd}{10.6}$$

As before, p is the slope in degrees and d is the internal diameter. But L is now the travel down the kiln per revolution. L and d are in the same unit such as feet or inches.

It may be noted by some that the factor of 10.6 is not the same as in my letter to the National Lime Association which was quoted in "Limeographs" of January, 1952. In that letter, I used 10.8, and this change will be discussed later.

The formula is put in still more useable form by changing the pitch in degrees to inches per foot. Nobody knows the slope of a kiln in degrees, but everyone knows it in inches per foot. The formula then becomes:

$$L=.45\ pd$$

It is now easy to use. If a kiln has a slope of ½ in. to the foot and an inside diameter of 8 ft.:

$L=.45 \times ½ \times 8=1.8$ ft. travel per revolution

What shall we do with this now that we have it? We can calculate the size of the load in the kiln, that is the dimensions of the segment.

Suppose you are charging 720 lb. of stone per revolution of the kiln. Upon weighing a cubic foot of the stone, you find it weighs 90 lb. So you are charging $720 \div 90=8$ cu. ft. per revolution.

By the formula, it has been calculated that the stone travels 1.8 ft. per revolution. So the area of the segment is $8 \div 1.8=4.4$ sq. ft.

In a chemical or engineering handbook, you can find a table that gives the data on dimensions of the segments for various areas. Since rotary kilns operate in a comparatively small range of segment size, the useful part of the table only is given below. The headings have the following definitions as shown by the illustration of a kiln cross section.

Degrees is the included angle of the segment:

- R = radius of the circle, in this case of the kiln lining
- H = height of segment, or the depth of load
- C = length of the chord, or the surface exposed to the flame
- A = area of the segment in square feet

TABLE OF CIRCLE FUNCTIONS

Degrees	H/R	C/R	A/R²
66	.161	1.09	.119
67	.166	1.10	.124
68	.171	1.12	.130
69	.176	1.13	.135
70	.181	1.15	.141
71	.186	1.16	.147
72	.191	1.18	.153
73	.196	1.19	.159
74	.201	1.20	.165
75	.207	1.22	.172
76	.212	1.23	.178
77	.217	1.25	.185
78	.223	1.26	.192
79	.228	1.27	1.99
80	.234	1.29	.206
81	.240	1.30	.213
82	.245	1.31	.220
83	.251	1.33	.228
84	.257	1.34	.236
85	.263	1.35	.244
86	.269	1.36	.252
87	.275	1.38	.260
88	.281	1.39	.268
89	.287	1.40	.277
90	.293	1.41	.285
91	.299	1.43	.294
92	.305	1.44	.303
93	.312	1.45	.312
94	.318	1.46	.322
95	.324	1.48	.331
96	.331	1.49	.341

It has been found that the area, A, of the segment is 4.4 sq. ft. in the 8 ft. kiln where $R=4$, and $R^2=16$.

So $A/R^2=4.4 \div 16=.275$

In the table under A/R^2, you find .275 which is 89 deg. minus. In the column H/R, the value is .287, so call it .285 since it is slightly less than 89 deg.

So $H=.285 \times 4=1.14$ ft.=13.7 in. depth of load

In the same way, $C/R=1.40$ and

*Vice-president, The Warner Co., Philadelphia, Penn.

the length of the chord is 1.40 x 4= 5.60 ft.

That is quite a heavy load, and this would tell you whether it would back over the feed end nose ring. Or if you want to know how much stone you can put in a kiln to give some desired depth, say 12 in., so as not to back over the nose ring, you can figure it back.

H/R=1 ft. ÷ 4 ft.=.25

In the table, this is 83 deg. minus, so A/R^2 which is .228 in the table, can be taken at, say .226. A=.226 x 16=3.62, the area of the segment.

The stone travels 1.8 ft. per revolution so the volume of stone that can be put in is 3.62 x 1.8=6.5 cu. ft. per revolution. If the stone weighs 90 lb. per cu. ft., the charge per revolution is 6.5 x 90=585 lb.

The load of lime in the calcining zone as seen through the peep hole in the hood will be less for two reasons. First, there is a densifying action due to abraded material filling the voids. This has been figured from a known condition as follows, but, if interested, you must make your own tests on weights of material per cubic foot.

Weight of stone	90 lb. per cu. ft.
*Theoretical weight of lime at 55 percent (deduction for dust loss)	49.5 lb.
Actual weight of lime	56 lb.
Densification 56/49.5	113 percent

Whereupon, the originally calculated area, A=4.4 sq. ft., becomes 4.4 ÷ 1.13=3.89 sq. ft., and the depth of load and length of chord are correspondingly less, as calculated from the table.

The second error is due to the lesser angle of rest (or repose as engineers say) of incandescent lime. This reduces the value of θ, reduces the factor, 10.6, in the denominator, and hence increases the travel per kiln revolution. This in turn reduces the area of the segment.

I do not know what is the value of θ of hot pebble lime, nor any sound way to ascertain it. But the lesser angle does exist. If it happens to be 25 deg., then $\sqrt{25}$=5, and the section is further reduced to ⅘ of its corrected value due to densification.

I mentioned above, my change of the factor in the denominator from 10.8 to 10.6. Other experimenters have done similar work and published the results, together with the derived formula. Stripped down to the useful form, the factor was 11.2.

Accordingly, I made my own tests on a model kiln to determine three points.

1. Whether the Bureau of Mines formula was correct (rather presumptuous on my part).

2. To see if it held equally well with a heavy or light loading. This point was not stressed in the Bureau of Mines paper.

3. Whether the factor changed due to change in particle size of the charge.

It was found that the rate of flow was surprisingly constant for various loads wherein the maximum was six times the minimum, and the tests fully bracketed any practical kiln loading.

Two sizes of stone flowed equally. All tests showed that the factor should be 10.6. This calculates correctly when the angle of rest θ=36 deg. My previous error was because I used θ=37 deg. So I agree with the Bureau of Mines paper rather than with subsequent work by other experimenters.

The work on the model kiln is of interest, and in a later issue, I will give details of this unit and our work with it.

*Varies considerably. Must be known from the kiln operating record. Dolomite will be about 50 percent.

Cement Outlook

CEMENT INDUSTRY OFFICIALS have predicted that cement shipments this year will equal or exceed the 1952 record-breaking total of about 250,000,000 bbl. Last year's peak production was achieved despite strikes at some cement plants. The total 1952 production exceeded the previous record of 241,000,000 bbl., established in 1951 and the 236,000,000 bbl. produced in 1950.

Some areas reported temporary cement shortages in 1952, but in most cases, these were caused more by physical limitations on the number of cars that could be loaded daily, or by local strikes, rather than by any shortage of production facilities. Some spot shortages are expected to appear in 1953, but no acute over-all scarcity is anticipated.

Capacity of the industry has been increased about 15-20 percent during the past two years. Most of the expansion has been in the South and West, resulting in a decentralization of the industry.

A move is expected to be launched in the new Congress this year to restore the industry's ability to absorb freight costs to meet competition. Under the Truman administration, the Federal Trade Commission succeeded in forcing the cement industry to abandon freight absorption, charging that it reduced competition. But even if freight absorption is legalized, it is not expected that the cement industry will ever again absorb freight costs on the scale once practiced, when northern plants obtained many of its customers from the South and West which now, in most cases, can obtain cement locally. Another factor which would prohibit freight absorption on a large scale is the freight cost on cement which reportedly has risen 85 percent since 1946.

Demand for cement has risen steadily in recent years, partly because of the building boom, but also because of its successful competition with other building materials. Twenty-five years ago, approximately 15 bbl. of cement were used per each $1000 of construction. Today the figure is estimated at 20 bbl.

The price of cement today is only about 60 percent higher than the average price between the beginning of World War II and 1951, compared with an increase of 150 percent in most other building materials.

R. A. Hummel, chairman of the board, Lone Star Cement Corp., New York, N.Y., predicts that the cement market will remain strong this year and possibly for several years. Victor Rhoadstrum, chairman of the board, Penn-Dixie Cement Corp., New York, N.Y., states that business is bound to be good in 1953, in view of the big road-building projects now going on in many states and an anticipated increase in general construction. W. A. Wecker, president, Marquette Cement Manufacturing Co., Chicago, Ill., also anticipates a good year for the cement industry. He announced that Marquette will spend about $2,250,000 in 1953 for capital investment, compared with $1,780,000 in 1952. He stated that the cement industry does not appear to be over-expanded at this time, with production capacity appearing to be about equal to demand, and added that a number of obsolete plants, operating alongside completely new plants, will undoubtedly be retired and scrapped when demand does recede. He also pointed out that the cement industry, through the Portland Cement Association, is steadily broadening the market for its product.

Roofing Granules

THE PRODUCTION OF ROOFING GRANULES in 1951 amounted to 1,614,779 short tons, valued at $24,284,137, as reported by the Bureau of Mines. This was a decrease of 10 percent in both quantity and value, compared with 1950 totals. The production of natural granules showed a 12 percent decrease, while artificially colored and brick granules, combined, decreased 9 percent. The average value for natural granules dropped to $8.08, but artificially colored and brick granules increased to $17.57.

Buy Quarry

THE BURLINGTON QUARRY, formerly owned by Material Service Corp., Chicago, Ill., has been purchased by Caesar Marconi, Franklin Park, Ill., Dan Noonan, Burlington, Ill., and A. C. Halquist, Sussex, Wis., who will operate the quarry under the name of Burlington Quarries Corp. Mr. Marconi is president of the new corporation, and Mr. Noonan, secretary and manager. In addition to the quarrying of "Sunset Stone," the company also deals in lime, washed sand and gravel.

Part II. Top Management's Support—no safety program is effective without it. Safety appreciation is something that must be acquired

Lea Warner, safety engineer, addressing an employes safety meeting

Accident Prevention Program That Works

By LEA P. WARNER*

PRACTICALLY EVERY SAFETY ENGINEER in the country would tell you that without management's support there can be no effective safety program. Although I subscribe wholeheartedly to this statement, I nevertheless cannot relinquish my own responsibility, as the company safety engineer, from the job of sufficiently interesting top management in the place and importance of safety engineering. This so-called selling job may be easy in one company and practically insurmountable in another, but in either case the job can be done. This job may take years and might even be accomplished by incident, by accident, or by fate. Certainly it will seldom come about unless all of those people in an organization band together and pound away on the topic until the one and only "boss" gets it, or the president, vice-presidents, etc. of larger outfits become convinced that they must "give in" to the pressure born. Actually I feel certain that all top management people today are aware of their responsibility of safeguarding their workers. The real problem is to show them how to exercise their responsibility.

In presenting my thoughts on this topic I should like to subdivide the topic into two parts. First, "Obtaining Management's Interest" and secondly, having gained that interest, to elaborate on "How Management Should Support the Safety Program." Although I have enjoyed many years of experience in this field, and perhaps think that I know some of the answers, an assignment such as this is indeed difficult and my comments should, like the study of economics, be taken purely as background upon which to help others study their own problems.

To become interested in the field of safety engineering, one must make every effort to understand the underlying philosophy—there must be developed that inward desire to save lives and prevent suffering. Our forefathers who ran their little organizations did not posses this humanitarian desire to protect their employees as they might protect their own children. We have frequently heard of stories where the employee, having suffered a disabling injury, was replaced on the job before he was taken to the hospital. We have even heard that bosses used to rush out to the time clock and pull the injured man's card so that they would not be paying for time not worked. Hard to believe isn't it—yet these incidents were true.

In this day and age we may not find time cards pulled but, and I regret that such things occur, there are those "bosses" who sincerely tell you that they are too small or can't otherwise afford a safety program. Such men put a price on the safety of their employees without realizing that they are doing just that. Their intent and purpose toward safety is truly the same as any man's; the unfortunate difference is that one boss has learned to integrate safety into his operations thus effecting a sound safety organization and one that produces more economically. The other boss, not having learned the technique, can only see safety work as something that is costing him money. This, of

*Safety Engineer, The Warner Co.

The Cement and Quarry Section Executive Committee (National Safety Council) and Board of Managers held one of their meetings at the Warner Company, Cedar Hollow lime plant. They are grouped around the safety record permanent trophy—a large boulder from the quarry which was erected by J. G. Wilson, general superintendent, on the lawn in front of the plant office entrance. Seven cedar trees form an additional background. Every year that the plant works without a lost-time accident gets stenciled on the stone

course, is a very false impression and management's practice of their attitude must be changed.

Must Acquire "Safety Appreciation"

When I was a little boy I was taken to the Academy of Music too frequently. I hated it. I thought it was a waste of time. How I wished that I could have gone to the ball game. But, fortunately for me, something happened that changed my narrow point of view. One day my eyes roamed around the audience—some folks were looking straight at the conductor, some had their eyes closed and were literally absorbing every note, while others appeared to have strained emotions, but all were just simply taken away by the music. Now this interested me. What in the world was I missing, then I worried a bit, something must be wrong with me—I definitely was not like other people. So, to make a long story short, I made it my business to learn something about the music and to find out what I was missing. Appreciation of music had to be developed in me, but fortunately I was willing to improve myself—to find out what I was missing.

After many years of experience I am convinced that interest in safety for top management is the same as music was for me. The big "boss" must *absorb* safety; he must be enthusiastic about safety and sold on its importance to his operating responsibilities if the rest of his employees are going to be able to say that "Our Boss" is really safety minded—and mean it.

The brutal truth is that so few in the small industry group can be aroused sufficiently to even report their accidents to the trade associations' safety contests or otherwise endeavor to improve their own accident experiences. Statistics do show that two-thirds of the industrial accidents occurring in 1952 happened in small manufacturing establishments employing 100 or less persons, so that if you are in this group perhaps you would like to climb out of it. If you are interested, you have only to say so and before you know it a whole army of helping hands will be at your service. Everywhere, people interested in safety work are willing to offer their experiences and insofar as possible, their time. This esprit-de-court reflects back to an earlier statement I made about safety people being so intensely interested in their work. In no other function of industrial operations will you find so many people ready and anxious to further their field of endeavor.

Have you noticed the increasing interest in "Off the Job Safety?" Some managements are spending a lot of time and money on this non-producing function—there must be a reason why. Some employers have become so interested in safety that they think the protection of employees and their families is most important. No matter where they are hurt, their absence or inability to fully perform their work affects the company. Accidents to members of the family have a psychological effect on other members, may even make them accident-prone during the period of sorrow. There is also the humanitarian angle and many industrial programs are built on this alone.

Have you noticed that more and more financial statements are devoting space to the company's safety record and safety work being done? Again there must be a reason. Stockholders, employees and other managements are all showing an interest in figures that show what effective work in preventing accidents is being done. In short, it shows that the company in question is a safe place in which to work.

Have you noticed that some recent industrial magazine advertisements depict the safety work they do in safety? I think that all of these trends indicate just one thing, top management is not only carrying out their responsibility for safety, they are proud of their work in this field.

I have purposely dealt at length on the necessity of the "Top Man's" profound interest in the safety of his employees. This, of course, must coincide with his insistance of integrating a sound safety program into his organization whether it be five men or five hundred. I have yet to see a truly effective and sound safety program in a company where top management is either not sold on the importance of safety work or fails to take active participation in the program. This is absolutely essential as I would now like to prove from a few pages of my own experiences.

During the war I had the fortunate experience of serving in the safety branch of the Navy. At the time I remember that the general public's opinion of Naval safety work was not too good. The government was always frowning on industry for its failure to do a better job of safety, yet the Navy with hundreds of thousands of shipyard employees had a very poor record, comparatively. The Navy, realizing that it did not have specifically trained men within its own ranks, went out into industry for its support. I, along with many other safety engineers, soon found ourselves face to face with what appeared to be an impossible task, but we helped to organize a program that, with the undeniable support of the top "brass," reflecting by order on

John Curtin, Jr., president, presents his trophy to Guy Johnson, loading foreman and plant safety chairman representing the employes. H. J. Whitten, vice-president, is seated awaiting his turn to speak to the employee group congratulating them and pledging his support of their safety program

Editor's Note

● A PREVIOUS ARTICLE outlined the basic elements of a safety program that has proven successful. These elements were:

(a) Top Management's Support

(b) Basic policies, procedures and practices

(c) The plant organization and Safety Program

(d) Medical and Compensation

The purpose of this particular article is to elaborate in detail on the first and **most important phase** of any safety program, namely "Top Management's Support."

down to all Naval branches, has today developed a program with resulting effectiveness that less hazardous industries would love to emulate.

I do not think that it is speaking out of school to cite one of my earlier company experiences that will further prove the importance of proper top management attitude toward and support of the company safety program.

During the early thirties when we safety engineers had a tough time obtaining any type of recognition of our efforts, I remember having been repeatedly slowed down by one of our general superintendents, who obviously was not anxious to allow his foremen to waste too much time on safety, nor were the recommendations for correction of hazards too enthusiastically received. Nevertheless our top management had seen fit to employ a safety engineer (and in these depression years) so in compliance to the intent and purpose of safety work, the superintendent did go along with the program. One day, and I will never forget the occasion, this superintendent addressed the safety committee, consisting of practically all of his foremen, and told them he had been all wrong in his attitude about safety and that he now regarded an accident as an indication that management was not doing its job efficiently. Henceforth, he was going to take an active interest in the support of a sound safety program, and that he was going to hold each foreman responsible for the health and safety of the men working under him. This superintendent had developed an appreciation for the importance of safety as a measure of operating efficiency, and he was BIG enough to tell his men that he had been wrong and was changing his thinking accordingly. From that time on the safety record improved and the superintendent, as well as the foremen under him, I am certain, would tell you that the efficiency of this company division had likewise improved. Where is that superintendent you may ask? Today, because of his aggressive thinking, not only as explained above, but on all company problems, he is an operating vice-president in charge of one of our main company divisions whose plants often operate full years without any lost-time accidents.

Safety appreciation is something then that must be acquired, and once acquired by the "Top Man" we are then well on our way toward a good safety record provided that all of the other policies, procedures and basic elements that make up a sound safety program are properly presented to the management for their consideration.

What, then, are some of the ways in which a "top man" can support the safety program? I would like to offer a few of my personal views and would further like to express them in terms of LARGE (5000 or more employees), MEDIUM (500-5000 employees), and SMALL (under 500) sized plants. The number of plants and geographical spread have important effects, but the idea is to always do more than you think you should for safety, not less.

Large Companies

In large organizations there are generally safety departments working directly under the president or tied in with the industrial relations department. You will generally find safety representatives or inspectors at each branch plant. These staff people represent the company's top management policies and procedures. Safety work is well organized and should function smoothly *if* the top management group takes an active part in all fields of safety activity.

Medium Sized Companies

I place my own outfit in this group. Here we probably will find one man in direct charge of the safety program. In the smaller plants, the industrial relations representative might have the dual responsibility of safety, but this is not advisable where labor relations (union grievances and contract negotiations) require so much of his time.

Where the medium sized company is large enough, plant safety men are advisable to head up the safety program and keep it rolling. We have found this essential in our own organization. In the medium sized company it is necessary for the president to take a more active interest in the safety program. His direct participation indicates automatically top management's support, and that support will reflect right on down through the company. It is further essential for the operating vice-presidents to take an active interest and to personally conduct foremen's meetings to relate their support of the safety program, the company's safety policies, etc.

In our company it would work something like this:

(1) The president, through the company safety engineer, is in complete contact with the accident picture. He presents the safety record monthly to his executive committee and when necessary they thoroughly review the unusual accidents. I might add that this group frequently uncovers unsatisfactory operating practices down the line as a result of reviewing these accidents. This alone will prove that safety work will save money, not cost money, and this type of incident can be multiplied many times in all group safety meetings. Unquestionably, safety work keeps all branches of management and employees on their toes which will enhance greater production, better relations among your personnel and certainly show up in economies up and down the line. I see this happen every day and I know that our company is no different than any other.

Our president sometimes makes his own plant inspections of hazards reported. He makes a point of knowing how injured employees are progressing and what we are doing for them. The president is as proud as anyone when one of our plants has won a safety award. We have two President's Safety Trophies, one presented annually to the plant having the best safety record in our large plant group and a similar trophy being presented to the small plant group winner. These, and other safety awards, are sometimes presented at an employee gathering for sandwiches, ice cream and coffee or a short interruption on the job (if we are terribly busy). In the latter case, in lieu of a "feed" the president, following the presentation of the trophy, may hand out some individual awards, lighters, pencils, wallets, etc., all suitably engraved.

The president's annual Christmas dinner message to the employees generally includes a resumé of our safety activities and a word to show all employees that safety is an important part of our business and a job for all of us to work on.

Active participation is what we mean by "Top Management Support."

(2) Vice-presidents' support of the safety program coincides with that of the president except, and this is the important part of their job, that they must personally consult their superintendents and foremen on the matters of safety just as they do on operations. In my opinion the whole safety program can fail or succeed right here. The task is simple and yet many top managers fail to do the managerial job they should when it comes to insisting on and following up on the safety work being done in the plants. Again I say this is unintentional. The vice-president may decide to hold a little "confab" with his top plant managers, but when he gets out on the scene, the crusher is down or the screen is passing too many large stones and the first thing you know the safety "confab" never did materialize. A vice-president who is actively behind the safety program will arrange to carry out a "confab" even though it may get temporarily sidetracked. He will pick up the telephone and ask his superintendent something about his accident record, what he is doing about correction of a certain hazard, have his foremen been holding their departmental safety meetings. I dare say that some vice-presidents rarely talk about safety to their superintendents. Again, not because they would not like to, they just have not trained themselves to do things that way. If it is important to talk about progress being made on a conveyor belt, etc., it is just as important to ask questions about other operating functions, such as safety. If the top man does not

lend this support, how can you expect those working under him to do anything about it?

In my book a vice-president should keep himself posted on how well all functions of his organization are working, and should particularly sit down at a dinner gathering or plant meeting and stress safety with his superintendents and foremen. I was particularly impressed with the subject matter presented by one of our vice-presidents to his supervisory groups at a dinner meeting. It went something like this:

A. Introduction of the Subject—Company Policy Cited

"I am glad to have this opportunity tonight to talk to you about safety—a subject which is very close to my heart. I also wish to further emphasize some of the company policies and my own particular outlook as it pertains to you men. It has been brought to my attention that there are some different views on basic responsibility for safety.

"(a) Top management must initiate a safety program and maintain it—not as a separate function but as an integrated part of all operations. The attitude of management has changed through the years.

"(b) This top management attitude and company policies must be carried down to the employees through the lines of supervision. The foreman, being the direct supervisor (salaried) of the men, is actually the man who should fully understand the policies and who should himself abide by them thereby creating a good example.

"We have the safety engineer available for advice and guidance, but safety of the employees is not his job, it is ours, and as such I must hold all of you men responsible for the safety of your men and of your equipment, much as you are held responsible for the operating function of your department."

B. Some Examples Are Cited

"(a) Even today we are sometimes faced with the problem of which comes first—the maintenance job or the safety job. If you expect me to say the maintenance job, you are wrong, neither will I say the safety job. I expect local management in cooperation with you foremen to use your heads in making a decision. If the condition is hazardous to life or limb—of course it comes first. If it can be roped off or abandoned until needed without hurting production, then catch up on a maintenance job, etc.

"(b) The safety job is yours—not the safety engineer, inspector, or safety committee.

"(c) Accident statistics will tell the story. An accident-prone department is generally one where the housekeeping is poor, the foreman allows his men to work unsafely without warning them or correcting their methods. Too often a foreman walks right by a hazard, maybe 100 times, without bothering to have it corrected—not until it causes an accident.

"(d) There must be cooperation between the foreman and local management to allow time to properly train new men and job transferees in their new work.

"(e) A foreman should make his own inspections of area and equipment under his jurisdiction and keep a written record of same.

"(f) A foreman should analyze his own departmental accidents.

"(g) A foreman should hold his own departmental meetings, once a month, keeping minutes of comments and action taken."

(3) Superintendents support of the safety program is likewise a logical and necessary step in the local plant program. What the superintendent does to carry out the vice-president's stated attitudes and what he does in compliance with company policies will reflect in the over-all "liveliness" of his plant safety program. Does he do just those things and show just enough interest in safety to satisfy top management or does he pitch in and follow-up his foreman on all matters concerning the safety program and even "jacks" the program up himself a little. His foreman will know how he really feels and so will the vice-president.

It is my opinion that the superintendent is in the saddle. He can lay down the law, he can make the safety committees function and he can keep the reported hazards at a minimum. When he makes a tour through the plant the first thing in the morning checking on operating functions, does he check on hazard correction progress? Does he ask questions about the accident that recently occurred in the department he is visiting? These are the seemingly little things that can make or break a safety program.

Small Sized Companies

In my earlier remarks I pointed out that statistics show that many of the accidents occur in small companies. That may be true, but these small companies outnumber the large ones by an unbelievable margin. I know of many small companies doing an excellent safety job and they should be commended for their work.

The job is so easy yet so hard to get started. If only the manager or top man of the small company would just take time to find out what he can do, how he could set up a small safety committee, how he could get his one or two or maybe more foremen trained, then do something about his safety program, the small company record as a total picture would be better.

I would say that the small-sized company "top man" might assume the same role as one of the middle-sized company superintendents except that he would have the added responsibility of forcing himself to develop policies that he will live up to.

I personally feel that all of us, in confronting a "top man" who must first see the light, should keep working together to convince our management that we want them to lend support to our safety programs, keep the subject coming to them from all angles at all times, and I think that eventually they will stand back of your safety program. We must never lose heart; we must never lose faith in our endeavor to convince top management that more interest must be shown and more time spent by management in helping to effectively prevent those injuries that disable their employees and may even throw whole families on relief. Behind this paramount issue of the protection of workers is the cash savings effected through sound safety programs to such an extent that modern management can truthfully not afford to sincerely establish a safety program.

Chemist at North Star

KARL AICHINGER of Braunschweig, Germany, has been appointed chemist at the North Star Cement Co. plant at Corner Brook, Newfoundland. He succeeds M. Linde, who passed away recently. Mr. Aichinger spent about a year at Corner Brook in 1951, investigating deposits of minerals for use in the production of cement, and remained there until the plant was well into operation.

A.R.B.A. President

ROBERT M. REINDOLLAR, consulting engineer of Baltimore, Md., was elected president of the American Road Builders' Association at its convention held recently in Boston, Mass. He succeeds Paul B. Reinhold, president of the Atlas Equipment Co., Pittsburgh, Penn., who served as president for two terms.

Robert M. Reindollar

TRUCKERS PROMOTE AGSTONE SALES

Maymead Lime Co., Shouns, Tenn., trains new drivers by having experienced operator accompany them for one or two weeks. Plan contest for slogans to be placed on delivery trucks

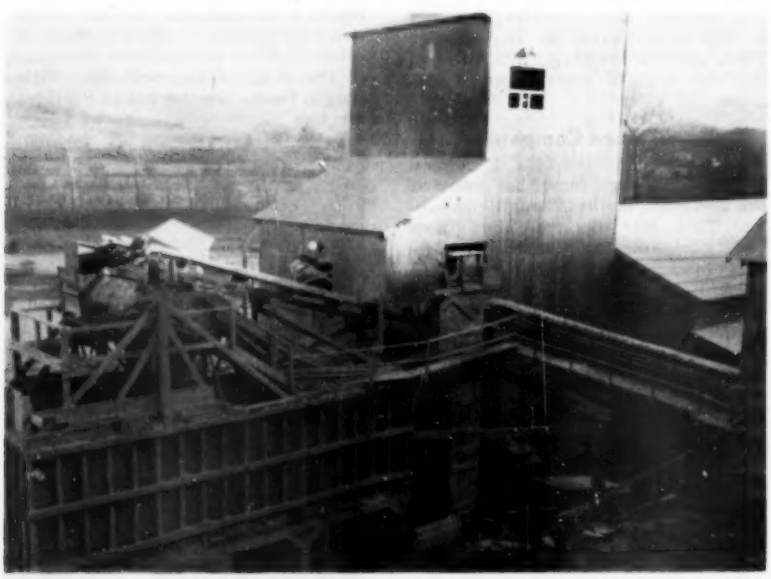
By L. DAVID MINSK

MAYMEAD LIME CO., agstone producer in Shouns, Tenn., formerly owned all its haulage units, hiring drivers to operate them. When a number of truckers in the area wanted work, the company adopted a new contracting practice which has been mutually satisfactory. Maymead Lime Co. supplies spreader beds, which it owns, to truckers at no cost to them. The trucker owns the truck and must meet certain minimum requirements. The trucker is paid by the ton on a scale varying with the haulage distance. In effect, the trucker is something of an independent business man subject to only one limitation: he must haul materials only for Maymead Lime Co. Other than that, he is free to work or not to work as he feels, and, if permitted, to haul noncompetitive materials for companies other than Maymead. The latter now has 25 units on this program.

The truckers' principal responsibilities include insurance coverage (personal injury and property damage), maintenance of the bed, and efficient, courteous service to the farmer. The company has long followed the policy that the customer is always right, and it backs this up by requiring truckers to treat the farmers as they themselves would like to be treated. If a trucker gives poor service, he is cautioned and told how to improve his service; if this has no effect the company can remove its spreader bed. In such a case a point is made to acquaint all other truckers with the reasons behind the action.

Drivers are trained informally by having an experienced operator accompany them for one or two weeks. Periodic checks are then made to determine the quality of the new employe's spreading. Most of the spreading, 75 percent, is done between September and December, so a full crew is trained prior to this busy period.

The company has experimented with the use of half-tracks (army surplus types) for spreading agstone over difficult terrain. It proved uneconomical—farmers objected to paying extra for the service, and operation of the half-tracks cost double the standard charge for spreading from wheeled vehicles. A half-track did prove useful for stockpiling concrete stone since it could travel up the pile, but when maintenance of the units became too costly the vehicles were taken out of service completely.



Crushed stone section added to older agstone plant. Belt conveyor from jaw crusher, to the right, can feed either crushed stone or agstone plant. Head pulley, operated when 15-ft. conveyor belt section is removed to discharge material to crushed stone plant, is visible just to the right of bucket elevator

An advertising scheme to be inaugurated by the company will be the placing of a different slogan on each truck. A contest will be run to obtain good slogans, with a free load of limestone awarded to each winner.

J. B. Mount, treasurer and sales manager

When this plan is introduced the company will run newspaper advertising on the theme "Watch for the slogans." The delivery area covers 20 counties in three states, and the planned advertising budget of $100 per county per year will be the maximum. Some newspaper advertising is carried in the summer months to remind farmers of the approaching spreading season.

Ninety percent of sales come through the Production and Marketing Administration program. The remainder are "cash" sales to farmers above the amounts P.M.A. will allow. Some material is also sold to fertilizer plants.

Plant

From the time of the company's founding in 1928 until 1948 agstone was the only product. In 1948 the plant was modified to also produce crushed stone as a buffer in case the government abandoned the payment-type conservation program. Crushed stone production has increased from 400 tons the first year to 59,000 tons last year. The plant has a capacity of 500 t.p.d. of agstone alone or 800 t.p.d. of crushed stone alone.

Processing plant is at the right with 150 ft. long covered stockpile area in the center. Old plant, now operated only in an emergency, is to the left, behind truck loading bin

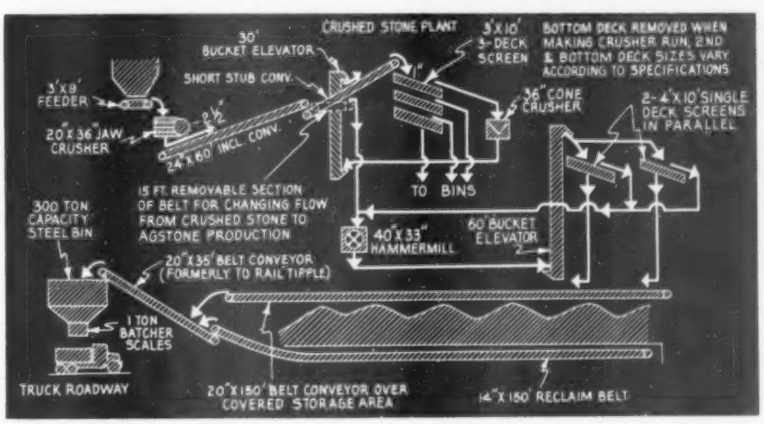
The new crushed stone plant consists of a 3- x 10-ft. Seco three-deck screen and a 36-in. Telsmith cone crusher in closed circuit. Rock from the quarry is dumped into a hopper over a 3- x 9-ft. Telsmith feeder which supplies a 20- x 36-in. Austin-Western jaw crusher set for a minus 2½-in. discharge. The crushed stone is transported by a 24-in. belt conveyor to a short conveyor feeding the three-deck screen.

The belt conveyor from the jaw crusher is used to feed either the crushed stone plant or the agstone plant hammermill. A change in flow from agstone to crushed stone is made by removing a 15-ft. section of belt so the discharge is to the short belt conveyor feeding the three-deck screen. A change-over can be made relatively quick, but in practice one material is made until a large enough amount is stockpiled.

Top deck of the three-deck screen has 1-in. mesh. Oversize from this is chuted to the cone crusher, and its discharge is returned to the screen feeder belt conveyor by a 30 ft. high bucket elevator. Middle and bottom decks of the crushed stone plant screen are varied according to specifications. The bottom deck is removed when making crusher run. A three-compartment truck bin is under the screen.

The hammermill for production of agstone is a 40- x 33-in. Cedarapids. Discharge from this unit flows over two 4- x 10-ft. Allis-Chalmers single-deck screens operating in parallel. Oversize returns to the hammermill and undersize goes to covered storage in a 150 ft. long shed by means of a 20-in. belt conveyor. This conveyor extends the full length of the shed; material is diverted to sections of the shed floor by means of a plow. The storage area has a capacity of 5000 tons.

Material is reclaimed by a second belt conveyor placed near ground level. It is fed by bucket loaders dumping into hoppers placed over the belt conveyor. The reclaiming belt is inclined for about 50 ft. at its discharge end to place it above a belt conveyor on 35-ft. centers; this operates at right angle to the long belt conveyor and loads a 300-ton capacity, steel truck-


CRUSHED STONE PLANT
30' BUCKET ELEVATOR
3'X10' 3-DECK SCREEN
BOTTOM DECK REMOVED WHEN MAKING CRUSHER RUN, 2ND & BOTTOM DECK SIZES VARY ACCORDING TO SPECIFICATIONS
SHORT STUB CONV.
3'X8' FEEDER
36" CONE CRUSHER
2-4'X10' SINGLE DECK SCREENS IN PARALLEL
20"X36" JAW CRUSHER
24"X60' INCL. CONV.
TO BINS
15 FT. REMOVABLE SECTION OF BELT FOR CHANGING FLOW FROM CRUSHED STONE TO AGSTONE PRODUCTION
300 TON CAPACITY STEEL BIN
40"X33" HAMMERMILL
60' BUCKET ELEVATOR
20"X35' BELT CONVEYOR (FORMERLY TO RAIL TIPPLE)
1 TON BATCHER SCALES
TRUCK ROADWAY
20"X150' BELT CONVEYOR OVER COVERED STORAGE AREA
14"X150' RECLAIM BELT

Flowsheet of plant crushing, screening and grinding operations. Note how short conveyor diverts stone from crushing plant to agstone plant

Quarry view showing ½-cu. yd. shovel loading truck

loading bin. Agstone can be sent directly from the hammermill to the truck loading bin by the overhead belt conveyor on 150-ft. centers which also discharges to the 35-ft. belt conveyor feeding the bin.

The reclaiming belt conveyor formerly fed material into a bin over a rail siding. When a flood washed out a lengthy section of the rail spur serving the entire area, the railroad abandoned the entire spur. The plant was changed to handle 100 percent truck shipments by adding the truck bin and the 35-ft. belt conveyor feeding it.

Quarry

The quarry presently being worked is 2½ miles by road from the processing plant. Principal equipment is a No. 614 ½ cu. yd. Unit diesel shovel. Five Ingersoll-Rand jackhammers and one wagon drill are used for drilling blast holes. Air is supplied by three compressors, a 315 c.f.m. Gardner-Denver diesel, a 315 c.f.m. Ingersoll-Rand diesel, and a 315 c.f.m. Chicago-Pneumatic powered by a 75-hp. General Electric motor.

Stone Specifications

Tennessee No. 33C specification crushed stone is the largest tonnage of material produced. Specifications for this subbase material are:

Passing 1 in.	100 percent
Passing ¾ in.	80-100 percent
Passing ⅜ in.	50-90 percent
Passing No. 4	35-65 percent
Passing No. 10	20-50 percent
Passing No. 40	15-30 percent
Passing No. 200	5-15 percent

W. B. Mount is president of Maymead Lime Co. and J. B. Mount is secretary-treasurer.

CELEBRATE WINNING OF SAFETY TROPHY

By BROR NORDBERG

Lyman-Richey Sand & Gravel Corp., Omaha, Neb., operating 12 dredge plants has achieved an outstanding safety record through a cooperative management-employe program

A SAFETY AWARD DINNER was held March 24 in the grand ballroom of the Castle Hotel, Omaha, Neb., by Lyman-Richey Sand & Gravel Corp., Omaha, to honor employees of its plant No. 7 at La Platte, Neb. This plant was winner of the ROCK PRODUCTS safety trophy awarded in the National Sand and Gravel Association safety competition for 1951, for the best record in the small plant group classification. It operated 44,646 man-hours without lost-time accident in 1951.

The trophy had been officially awarded to Vice-President Lewis C. Curtis and General Superintendent A. P. Jones on February 26 at the National Sand and Gravel Association convention in San Francisco, Calif. This being the first national recognition given the company for a truly remarkable progress record in safety, it chose the occasion of its annual dinner for special recognition to plant No. 7. It was the editor's privilege to be invited to participate in the program and make the presentation to foreman Emil Seier of the winning plant.

These annual dinners are held in Omaha or sometimes in another location where the company has a plant. All foremen, supervisory personnel, executives and their wives are invited guests, and occasionally all company employees are invited when available accomodations permit. Purpose of the meetings is to express the appreciation of management to all its employees for their loyal cooperation and service during the past year. They were started originally as a vehicle to discuss supervisory problems but now are held as an informal social get-together to enjoy a good meal and have some fun. They also are the occasion for giving cash awards made to foremen annually in the inter-company safety competition.

Presenting ROCK PRODUCTS safety trophy. Left to right: Fred P. Curtis, president; H. A. Koop, safety director; Emil Seier, foreman of plant No. 7, and A. P. Jones, general superintendent

These awards are scaled according to the comparative safety records.

This year the attendance was 185, including all the employees of plant No. 7 who, with their wives, were seated at a special table. President Fred P. Curtis was master of ceremonies, Safety Director H. A. Koop awarded checks to each foreman in the safety competition and cited the respective records. Service certificates signed by the president were awarded by J. R. Burke to employees with records of service ranging from 5 years to 56 years for one employee, as a token of appreciation for their loyalty and efficiency. The proportion of workers continuously employed by the company for periods of 10, 15 and 20 years and more was surprisingly high. There were 77 employees with 10 or more years of service, 27 with 25 or more years service, and five who had been employed for 40 years or more.

Each individual was asked to stand when his name was called. General Superintendent Jones read the acceptance speech as given at the San Francisco safety trophy presentation, which effectively pointed up the importance of safety and the great benefits that have accrued to the employees and their employer. Guests were Mike Timmins, Omaha Safety Council who spoke briefly, Tom A. Burke of the National Safety Council, Chicago, Ill., Robert Adams and Yale Holland, attorneys of Kennedy, Holland, DeLacy and Svoboda, George Buchanan and John Elliott, Hartford Accident and Insurance Co., and the editor of ROCK PRODUCTS.

While in Omaha we had an opportunity to discuss the company's safety program and the record for its many plants, which is more outstanding than the top award to any one of its plants would indicate. Certainly, the value of its safety program has been documented beyond question and proven to have measurable economic benefits, to say nothing of the most important purpose which is to prevent injury to employees.

Dredge Operations

Lyman-Richey Sand & Gravel Corp. is one of the largest sand and gravel producers in the United States, ranking about sixth in production. It has been in operation since 1884 and

At speakers' table, from left to right: Mike Timmins, director of safety for Nebraska Motor Carriers Association and safety engineer for city of Omaha; Mrs. H. A. Koop; H. A. Koop, safety director of company; Tom A. Burke, director of local programing, National Safety Council; Bror Nordberg, editor of ROCK PRODUCTS; Fred P. Curtis, president of Lyman-Richey Sand & Gravel Corp.; Mrs. Fred P. Curtis; J. R. Burke, secretary-treasurer of the company; Mrs. J. R. Burke; A. P. Jones, general superintendent; and Mrs. A. P. Jones

the number of plants in production throughout Nebraska has varied and, at one time, was more than 30.

At present there are 12 permanently-located plants in production as far distant as the Bridgeport plant, 450 miles west from Omaha. All operations are in the Platte Valley and 10 are rail-shipping plants. The other two ship by truck.

All plants are similar in type, each being a hydraulic dredge operation. Sizes of dredge pumps are 8 and 10 in. and delivery is through pipelines to screens superimposed over bins. Generally, the deposits are characterized by excess of sand, and gravel sizes are on the small side. There is no need for crushing, and it is usually necessary to waste considerable sand. Bin capacities are relatively small and there is considerable stockpiling and rehandling by power equipment. Capacities are high per man-hour. The company has a sizable truck fleet for delivery of sand and gravel.

All plants are supervised from the central office in Omaha. A. P. Jones is general superintendent for all operations and each plant has a foreman in charge. Personnel in the various plants ranges from 4 to 12 depending upon size of plant and demands for production.

An organized safety program was first started in 1933. In the Spring of that year the company's compensation insurance carrier had decided to cancel its policy because of the company's unfavorable accident experience record. There had been 72 lost-time accidents for the years 1931 and 1932, and something had to be done about it.

The company set itself up as a self-insurer and organized a safety program to encompass all plants. Physical examinations were made a requirement for all employees, application for membership in the National Safety Council was made and H. A. Koop was appointed safety director.

Employes of plant No. 7 and their wives. Back row, left to right: Messrs. Elmer Haffke, Waldemar Long, Glen Eaton, Wm. Paben, Charles Koke, Jr., Eugene Lester, Emil Seier, J. W. Taylor, Howard Taylor, Earl Owings, Dean Taylor, Harold Seay, Charles Koke, Earl Larson, and Glen Larson. Front row, left to right: Mesdames Earl Haffke, Glen Larson, Waldemar Long, Glen Eaton, Wm. Paben, Charles Koke, Jr., Eugene Lester, Emil Seier, J. W. Taylor, Howard Taylor, Earl Owings, Harold Seay, and Charles Koke

Plant supervisory group. Back row, left to right: Harley Eschliman, Cecil Carr, Vilas Spangler, Leo Boruch, Walter Dryden, A. P. Jones, Glen Larson, Howard Nord, John Koop, Chris Olsen, Adolph Laska, and Fred J. Curtis. Front row, left to right: Chas. O. Hitchings, Bernard Adams, Cliff Jungles, Leo Peters, Joe S. Johnson, Ray Fuller, Rudy Baasch, Orsie Adams, Emil Seier, Myron McDonald, and H. A. Koop

Then followed preliminary inspections at each plant when all hazards, mechanical, mental and personal, were noted in order to plan a campaign for correction. Bulletin boards for safety posters were erected at each plant and a subscription taken to a poster service. A concentrated drive was quickly pushed to eliminate all hazards.

A program for monthly safety meetings at each plant, and covering plant inspections, was set up. At these meetings, all phases of operations were discussed from the viewpoint of adopting safer methods. Suggestions were invited from all employees in order to emphasize each individual's importance and his part in the safety program.

Inter-plant Safety Competition

In order to sustain interest, an inter-plant safety competition was established whereby cash awards would be awarded annually to foremen, the amounts pro-rated according to comparative records. These cash awards are substantial and, in recent years, foremen for each plant, the shop, laboratory and other departments have all received cash awards. None have been omitted and one good reason has been that the safety record has been successful throughout all departments and at all producing plants.

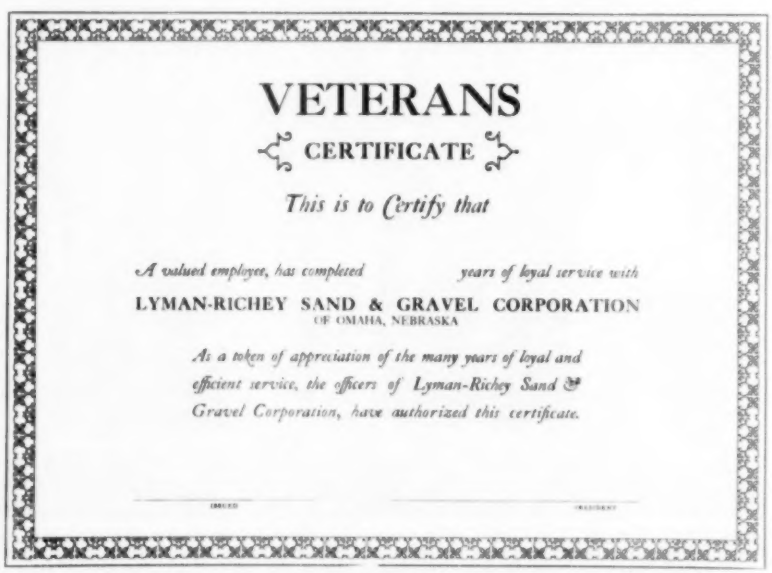
Mr. Koop regularly inspects the various plants and, when he does, all employees participate in the meetings. In the event of an accident, it is investigated quickly and discussed thoroughly without delay while the men are all mindful of it. Occasionally, special meetings are scheduled to consider certain classifications of hazards which deserve extra emphasis.

Mr. Koop has had the full support and cooperation of management throughout the 20 years he has been charged with responsibility for safety and his was a happy selection. He, more than any other individual, is given credit for the company's outstanding safety record. Mr. Koop has been with the company for his entire working life, and completed 40 years of service in March of this year. He is particularly well-qualified to guide the safety program, having been engaged as an employee and foreman in the various plants over a period of years. He has practical knowledge of the equipment and working conditions at all the plants and the ability to anticipate and recognize accident hazards. Most important, our observation is that he is a worker's type of supervisor. He is universally well-liked and, respected for his common sense approach to the prevention of accidents. His real approach is to instill a safety consciousness in the minds of all employees.

The record speaks for itself as to success of the program. Immediately after starting the safety program, there was a remarkable drop in the number of lost-time accidents. There were seven for the first year which is the most for any year since the program started. A perfect record for all plants is the established goal and this has been nearly accomplished several times.

Safety Record

In the 1951 National Sand and Gravel Association competition, six of thirty reporting plants with no lost-time accidents were Lyman-Richey. There were 490,928 man-hours worked by the company's plants with three reportable accidents of which only one was an official lost-time accident. In 1952, the record continued outstanding with 539,984 man-hours worked in all the plants without a single lost-time accident chargeable to sand and gravel operation. This



VETERANS

CERTIFICATE

This is to Certify that

A valued employee, has completed _____ *years of loyal service with*

LYMAN-RICHEY SAND & GRAVEL CORPORATION
OF OMAHA, NEBRASKA

As a token of appreciation of the many years of loyal and efficient service, the officers of Lyman-Richey Sand & Gravel Corporation, have authorized this certificate.

_____ _____

Veterans Certificate awarded to employes who have given many years of loyal service

has been accomplished for an overall operation encompassing widely scattered plants under different supervisors and with a fairly high ratio of changing personnel in each.

The record was so improved during the first ten years of the program that, in 1943, the company's compensation insurance business was solicited by the former carrier and a policy furnished on a retrospective plan basis. Substantial savings had been achieved each year as self-insurers and sizable refunds have been made each year under the retrospective plan. Since any savings in operations reflect in profits, the safety program has contributed importantly to the company's ability to extend free life insurance. Each employee, after six months' employment, is granted a free $500 policy, and after one year's employment is granted an additional $500, making a total of $1000 free life insurance. This is paid for wholly by the company, and the employee is entitled to further life insurance in amounts according to his position, on which he contributes part payment and the company the remainder. These amounts range from $1000 for common labor to $3500 in the supervisory group. The safety program also has contributed to providing free polio insurance, adopting a hospital insurance plan with benefits for each employee and his family, to increasing wages substantially and inaugurating a paid vacation plan started in 1950. After 12 months' employment, a worker is entitled to a week's winter vacation and, after 48 months, he gets two weeks' vacation.

The foregoing are a definite measurement, in dollars and cents, of the value of a sound safety program but, as expressed by Mr. Koop, these results could not have been accomplished without the full cooperation of the employees which proves the program has definitely contributed to better inter-company relations. Aside from recorded substantial savings as comparatively measured in compensation payments, efficiency has been much improved, production has been accordingly increased and absenteeism much reduced. It is believed that the safety-conscious worker is a more satisfied worker and that his attitude is reflected in his home and community as side benefits. Cost of the safety program and its maintenance was proved to be negligible.

Sets New Safety Record

NATIONAL GYPSUM CO., Buffalo, N.Y., recently announced the injury rate in its 35 plants last year was cut 31 percent, despite a 10 percent increase in the number of hours worked. The company's disabling injury frequency rate was 7.6 per 1,000,000 man-hours, compared with 9.1 for all industries. For the second consecutive year, there were no fatalities through industrial accidents in any of National's plants.

Rocky's Notes

(Continued from page 47)

charged chlorine ions (anions) profoundly affects the pH values of the solutions, both ionic and colloidal, and geochemists can prove to us that changing the pH has very important effects on all such mineralogical reactions.

If the chemical effects are of equal importance to the physical effects of air entrainment, there are doubtless other organic or inorganic substances which in very small amounts may well improve or ruin concrete, as the case may be. However, the point here is that we should know a great deal more about the nature of air entrainment in concrete before we base all our conclusions that it is the answer to the best possible concrete, merely because it has shown weathering resistance for not more than 14 years to date. If the physical explanation of its resistance to freezing and thawing is correct, the minute air pockets may in time fill up with deposits of calcium salts, or of some other mineral, for even if the moisture goes in and out of them as vapor, the vapor can carry some slight amount of a salt in solution. That is obvious to anyone who heats his home with low pressure steam or vapor made from a hard water, for the air escape (vacuum) valves, where no water reaches them, eventually become incrustated with calcium salt deposits. We will know more about the effectiveness of air entrainment 50 or 100 years from now, and, for the sake of the industry, we sincerely hope purposeful air entrainment is the right answer. Nevertheless, we know even now, that is is not the *only way* to make good concrete.

New Ore Beneficiation Process

INTERNATIONAL MINERALS & CHEMICAL CORP., Chicago, Ill., recently announced the development of a new and revolutionary ore beneficiation process applicable to potash and phosphate and to many other types of ores. The announcement was made by Louis Ware, president, who stated, "This new process results in a great economy in comparison with any other present methods. The process which uses neither reagents nor water, but is a dry beneficiation method, has been named the 'LeBaron-Lawver Process'."

The new ore refining method was developed under the direction of Dr. Paul V. Manning, vice-president in charge of research, and Dr. I. M. LeBaron, director of International's research laboratories. Also associated in the project was James E. Lawver and other research staff members.

The new process was developed after many years of research at the company's experimental station and pilot plants at Mulberry, Fla. The process was explained as follows: the ore is ground, dried and given a simple and inexpensive treatment, after which the ground ore is passed between electrodes. As the treated ore passes between the electrodes, it separates into various minerals. A number of patent applications have been filed covering the new process and the equipment used.

It was also announced that the company plans to build a new and larger pilot plant at the present Carlsbad refinery where the new beneficiation process will be applied. Plans also are being developed for another shaft and mine on International's new ore body in the Carlsbad basin, and designs are being completed for construction the first large potash-producing unit in that location which will utilize the new process.

Safety Citation

EMPLOYES of the Painesville, Ohio, plant of Standard Portland Cement Division, Diamond Alkali Co., Cleveland, Ohio, were recently cited by

Shown above is William Stinchcomb, office manager, presenting safety honor card to Alfred Rigby, who has an 8-yr., accident-free, work record

the Portland Cement Association for outstanding achievements in safe workmanship. Safety honor cards were awarded to 126 employes of the cement division whose combined worktime records represented 1237½ years of no lost-time accidents. Later, "Silver Honor Roll" certificates are to be presented to all employes who have attained 25-year, accident-free, service records. One employe has attained 27 years of accident-free service; five have attained 26 accident-free years; nine are in the 20-25 year group; and 24 have worked 15-19 years without a lost-time accident.

Limestone Plant

YATES BROTHERS EXCAVATING CO., Fort Dodge, Iowa, has started operations at its new limestone quarry and plant which are operated under the name of Northwest Stone Co. Plant equipment includes a 22-ft. impellor-type crusher, 80- and 105-ft. conveyors, vibrator screens and two 21-cu. yd. hoppers.

Theory and Practice of

By VICTOR J. AZBE*

LIME MANUFACTURE

Part IV. Factors governing time of calcination of limestone

THE DUTY NOW DEVELOPS on us of connecting all of the foregoing with practical kiln performance. This we aim to accomplish with Fig. 14. Practical experience indicates that 5-in. thick stone, which is not slabby, may be both preheated and calcined during 12½ hours of kiln passage. This is indicated by the circle on the graph.

If this stone happens to be excessively slabby, it may require double the time or 24 hours or even more if greater in thickness, and conceivably as much time as 50 hours.

The time of 12½ hours is for reasonably good kiln conditions, a fairly high rate of gas flow, but not excessively high temperature. It is for kilns wherein the gas distributes freely, not for those which are partially blocked by fines.

From the objective point downward, the time for smaller stone, both equilateral as well as oblong, is given, being based on the relative results obtained during these tests as compared with the established practical objective.

Offhand, it is difficult to believe that the rate of reduction in time required is so great, but the matter has been checked in other ways than just the present series of tests. The whole was not only theoretically but also practically demonstrated.

The time given may be much longer if kiln conditions are poor and it also may be shorter if they prove better. What the utmost limit may be needs to be found out by further study of heat transfer conditions and the application of the findings in actual kiln design. However, even now the indications are that lime-kiln improvement should not be a matter of aim for higher temperatures, but rather for thermally effective attainment of lower temperatures. It should be a matter of aim toward high heat transfer rates obtained through forced convection. The creation of a kiln state of high surface content and attainment of maximum possible exposure of the existing surface. The more active surface area a kiln possesses, the higher is its possible capacity, and for any given capacity the better is the lime.

The next section of this series will deal with effects of "Dissociation Temperature and Heat Requirements on Time of Calcination" for varied types of magnesitic, dolomitic, calcitic limes, including the hydraulic type.

*Azbe Corporation, St. Louis, Mo.

Applicability of Test Data

In all of the tests made and reported here, the surface of the stone was freely exposed to heat, a condition approached in the vertical kiln, but not equally so in a rotary kiln. The rotary kiln functions by an entirely different principle, to much of which the foregoing data does not apply.

The vertical kiln constitutes a bed of broken solids whose surfaces are exposed to the gases passing through the voids of the bed. Most of the stone surface is active in absorbing the heat, and most of the heat is transferred by convection. As the smaller size stone presents a greater amount of surface and simultaneously a lesser calcining depth, its calcination time is much shorter under equal temperature and gas flow conditions. For stone of half size, the surface area is double and calcining heat penetration only half, resulting in one quarter of the calcining time required for the larger size.

In the case of the rotary kiln the conditions are quite different, and there is no particular performance advantage if stone is ⅜ in. x ¾ in. as compared to ¾ in. x 1½ in., even though the calcining rate of the smaller, if exposed, is four times as fast. The reason for this, of course, is that virtually no flow of the heating gas through the stone bed exists. There is but little of the collective (aggregate) surface of the stone exposed at any one time and convection heat transfer is very limited.

Heat transfer thus is mainly by radiation, and because of the limited stone surface exposure, it is necessary to maintain a temperature gradient of the gas stream from about 3000 deg. F. on one end to 1500 deg. F. on the other to obtain a high capacity. In the vertical kiln, if the gas flow rate is high, a high capacity may be attained with a temperature gradient through the kiln of only 2100 down to 700 deg. F. If the rotary kiln were of the ordinary unmodified type operating under the above vertical kiln temperature gradient, it would make very little if any lime, as radiant heat impact would be too feeble.

This is not put forward with any particular desire to argue the matter of "vertical versus rotary kilns," but mainly to point out why the developed calcining rates do not apply to rotary kiln conditions. If the stone

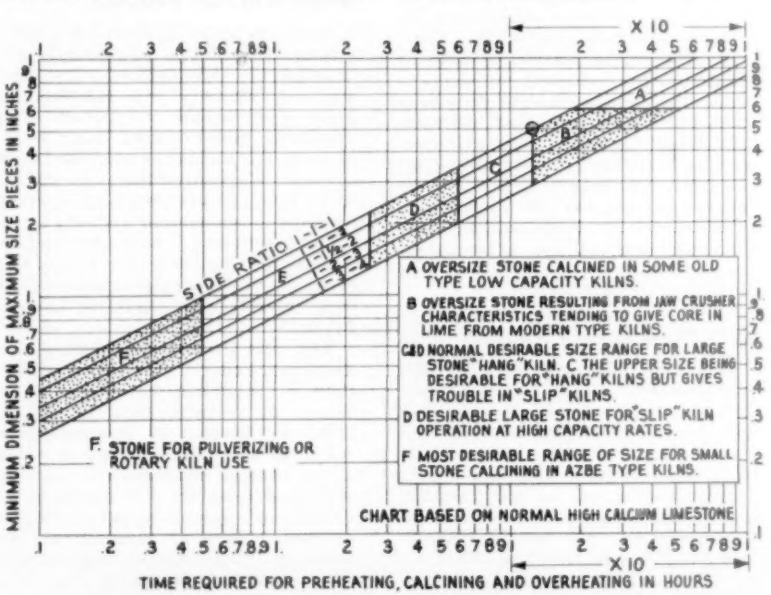

X 10
MINIMUM DIMENSION OF MAXIMUM SIZE PIECES IN INCHES
SIDE RATIO 1-1
1-½-2
1-¼-4
A OVERSIZE STONE CALCINED IN SOME OLD TYPE LOW CAPACITY KILNS.
B OVERSIZE STONE RESULTING FROM JAW CRUSHER CHARACTERISTICS TENDING TO GIVE CORE IN LIME FROM MODERN TYPE KILNS.
C&D NORMAL DESIRABLE SIZE RANGE FOR LARGE STONE "HANG" KILN. C THE UPPER SIZE BEING DESIRABLE FOR "HANG" KILNS BUT GIVES TROUBLE IN "SLIP" KILNS.
D DESIRABLE LARGE STONE FOR "SLIP" KILN OPERATION AT HIGH CAPACITY RATES.
F MOST DESIRABLE RANGE OF SIZE FOR SMALL STONE CALCINING IN AZBE TYPE KILNS.
F. STONE FOR PULVERIZING OR ROTARY KILN USE
CHART BASED ON NORMAL HIGH CALCIUM LIMESTONE
TIME REQUIRED FOR PREHEATING, CALCINING AND OVERHEATING IN HOURS

Fig. 14: Basic time for preheating, calcining and overheating with varied size stone

surface in the rotary kiln could be exposed as in the vertical, then considering the high temperature, the time of passage through the kiln would be but a fraction of that now ordinarily prevailing. It is the writer's firm opinion that the rotary kiln development trend has taken the wrong direction, to the ever longer, larger diameter kilns. In the case of the vertical kiln, capacities are increasing but the kilns are getting smaller, for here the effort toward development is centered toward increased and fuller utilization of stone surface exposure.

Preheating and Calcination

Before we delve deeper into the maze of factors governing rate of calcination, we should correlate all of the foregoing tests and combine them into some practically attainable vertical kiln performance formula. This we aim to accomplish with Fig. 14, which combines the laboratory results with actual plant performance in such a manner that kiln time required for combined calcination and preheating is reduced to hours of passage for normal type high calcium stone of different sizes and shapes.

So far in these pages we have shown the benefits of temperature as well as its objections and also the objection to excessive stone size. We have reduced the test data to the establishing of the prevailing surface conductance rate, and found that these data are such that under proper conditions they may be obtained in practice.

We now know much more about manipulating kiln conditions toward better results. We know more about stone selection, for more heat absorbing surface within the kiln, and, by other means, we know more about making this surface more active. We now are more fully aware that heat transfer in vertical kilns is a function of pressure drop, of higher gas velocity, and we know how to arrange the kilns for better gas distribution, better temperature control, better and more positive flow of lime through the kiln, less hangs, less channeling, freer passages.

It is through the above, that laboratory test results of the 2100 deg. F. series become applicable and conform to good results obtained in practice. Thus practical experience indicates that 5-in. thick stone which is not slabby, an approximate cube, may be both preheated and calcined during 12½ hours of kiln passage. This point is indicated by the heavy dot and guide lines of Fig. 14.

If stone of this thickness happens to be excessively slabby it may require double the time, and if larger in thickness as well as slabby, conceivably 50 hours or more may be required, thus giving core unless the stone happens to break while passing through the kiln.

From the objective point downward, the time for smaller stone, both equilateral as well as oblong, is given, being based on the relative results obtained during these tests as compared with the established practical objective.

Offhand, it is difficult to believe that the rate of reduction in time required is so great, but the matter has been checked in other ways than just the present series of tests. The whole has been not only theoretically but practically demonstrated.

The time given may be much longer if kiln conditions are poor, and it also may be shorter if they prove still better. What the utmost limit may be needs to be found out by further study of heat transfer conditions and the application of the findings in actual kiln design. However, even now the indications are that lime-kiln improvement should not be a matter of aim for higher temperatures, but rather for thermally effective attainment at low temperature. It should be a matter of aim toward high heat transfer rates obtained through forced convection and the creation of a kiln state of high surface content and maximum possible exposure of the existing surface. The more of an active surface area a kiln possesses, the higher is its possible capacity and for any given capacity the better is the lime.

Increasing Kiln Capacities

The above time rate converted into kiln size represents an almost unbelievable capacity, which, however, is now being attained. Thus, with stone whose maximum size would run approximately 3½ in. x 6 in. x 9 in., that is "a 6-in. stone," a production of 60 tons of high calcium lime per day is being attained by kilns of but 10-ft. shell diameter of low active height and only 1000 cu. ft. of combined calcining and preheating zone volume.

The passage time through those zones is but 10 to 11 hours, when 20 hours was previously considered as very good, and in some of the older type of kilns extended to 100 and even more hours of time.

But this 10 to 11 hours' time of travel is not necessarily the limit. Once obtained, if there is the will to do so, ways are usually found for a higher rate. Thus it is quite likely that 80 tons of lime may some day be obtained from these kilns which were once rated as 8 tons. This is not necessarily through raising temperature but rather through modifications leading to increased surface exposed to heat and improved heat transfer rate. A good plant manager can in this way continue to improve operation of his kilns indefinitely, as this particular case has so outstandingly proven. Any kiln can be improved, regardless of its state of perfection or imperfection. To become set and satisfied with results is the greatest of errors.

Incidentally, it must be assumed that kilns thus forced will give a poorer quality of lime. Quite the contrary is true. It has been demonstrated that lime becomes impaired only at the higher temperature when retained there for prolonged time. In this case the higher capacity is obtained through greater stone surface and higher gas velocity rather than a higher temperature. Thus since temperature is less, and time of retention is also less, the combination produces a lime that is actually better than that obtained at low capacity rates. This is particularly true when the kiln has the new lower temperature lime calcination "finishing zone" incorporated.

In the past kilns have been evaluated by their height and their shell diameter and some mighty large kilns have been built which, however, produced but little lime. The most extreme contrast to these new 10-ft. diameter, 60-ton kilns are the 24-ft. diameter also 60-ton kilns, the famed Palmer double kilns as operated 30 years ago. (See Fig. 15.)

It was also the case with boilers, radiators and other heat-transfer equipment, designed in the light of limited understanding of the past, which were large in size but limited in surface and flow rate and thus limited in performance efficiency. Today these are compactly built but of high surface area and with high gas velocity forcibly induced, and capable of tremendous heat transfer rates. It is in this way also that the aforementioned 10-ft. kilns give the results that they do, and that the kiln passage time of the chart is borne out in practice.

Various Kiln—Capacity Factors

There are many factors governing the calcining rate and kiln capacity. Some are factors of stone composition and of stone size. There are factors of kiln size and kiln proportions, factors of combustion, heat requirement and heat transfer. In general, however, there are two principal factors, as follows:

(1) The kiln must provide enough active surface to absorb the amount of heat that needs to be transferred at a reasonable temperature differential through the kiln, and a minimum of terminal temperature difference at both the kiln exhaust and lime draw points.

(2) The shaft must have enough free area to pass the gases of combustion necessary in the delivery of the required heat at a high mass flow rate.

Manipulating these, leads one to ever higher capacity kilns, which simultaneously become smaller in cross section and lower in height. We mean it leads to this provided a negative

factor does not inject itself, which, if not recognized and successfully combated, would limit the results. Some of these negative factors are obscure, and while some are of minor importance individually, combined with others they may become major in obstructing effect. Therefore, for a true understanding, in as far as possible, all should be known and all evaluated for their likely effect. As here given they make a long list but not necessarily a complete list. Others could be added.

Stone Factors—Individual Pieces

(1) Stone size (width in inches). (This is the approximate square screen size.)

(2) Stone volume (cubic inches). (The greater the volume the greater the heat required, the lower the surface and the longer the time.)

(3) Stone weight (specific gravity, porosity). (The heavier stone individually requires more heat and therefore is a proportionally less surface.)

(4) Stone shape (ratio of sides). (If equal in volume, slabby stone is preferable as it presents more surface.)

(5) Maximum and mean calcining depth. (The greater the depth to be calcined the worse the condition.)

(6) Stone surface area. (The greater the surface the better.)

Stone Factors as to Mass

(1) Kiln stone size and surface diversity. (The more uniform in size the better.)

(2) Kiln stone size predominance. (Do the large sizes predominate or the small? The large require more time, the small admixed obstruct the flow.)

(3) Minimum dimension of maximum size pieces. (If thick these give the core.)

(4) Shape factors of maximum size pieces. (Particularly undesirable if thick large slabs.)

(5) Kiln stone size segregations. (The small and the large should distribute equally or there will be nonuniformity of gas flow.)

(6) Disintegration of stone or lime in kiln. (This can be serious in blocking the shaft.)

(7) Packing of kiln bed uniformity. (Nonuniformity will cause nonuniform gas flow.)

(8) Fractional value of voids of shaft volume. (The higher the value the greater the possible gas flow.)

(9) Stone or lime surface per cubic foot of volume. (It will be greater as the stone unit size becomes smaller.)

(10) Percentage of surface area active in heat transfer. (To be of value surface must be active; 50 percent active is good.)

Heat Conductivity Factors

(1) Thermal conductivity of stone. (It will be from 20 to 25 B.t.u./hr./deg. F./sq. ft./in.)

(2) Thermal conductivity of lime. (It will be far less than stone and thus insulating in tendency.)

(3) Thermal diffusivity. (This is a factor of conductivity and specific gravity.)

(4) Thermal gradient through lime and stone. (Thermal head required to impart the heat to the stone.)

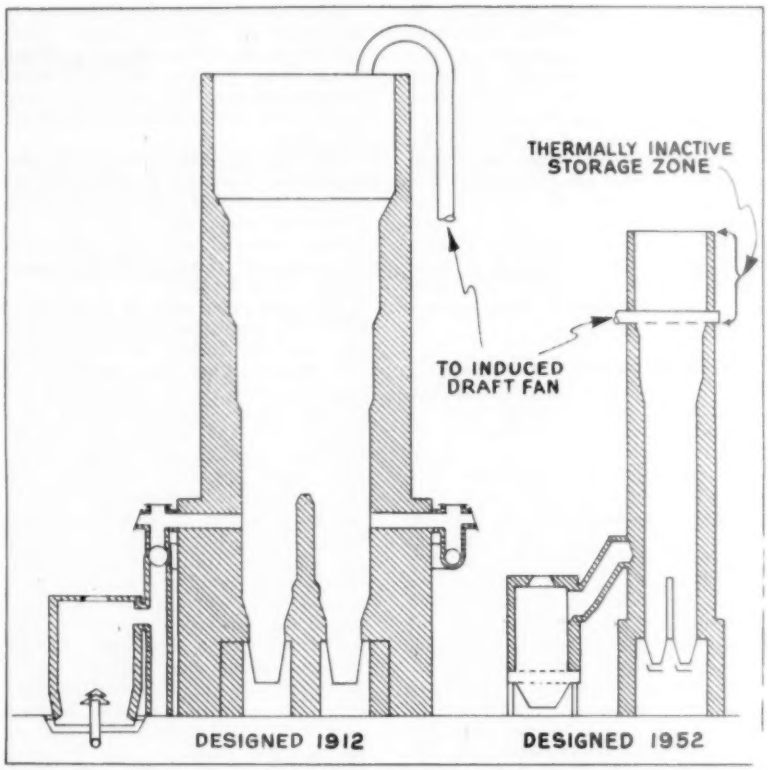


Fig. 15: To the left, 24-ft. dia., 60-ton induced draft kiln designed in 1912, compared with the 10-ft. dia., 60-ton kiln designed in 1952

State of Calcination

(1) Calcining rate. (The time required for various percentages of calcination completion.)

(2) Progression rate of the zone of calcination. (The rate at which the calcined layer builds up in inches per hour.)

(3) Depth of the interfacial region. (The distance between fully calcined lime surface and uncalcined stone surfaces.)

(4) Interfacial surface. (The active calcining surface within the interfacial region.)

(5) Degree of precalcination within core. (Due to fissures, portions of some core calcine ahead of main lime.)

(6) Interfacial CO_2 equilibrium temperature. (The temperature corresponding to CO_2 pressure prevailing.)

(7) Actual interfacial temperature.

(8) Interfacial thermal head. (The difference between (6) and (7) determines the calcining rate.)

(9) Calcination resistant nuclei. (What is the proportionate time required to calcine residual fractions?)

Temperature, Time Factors

(1) Surrounding temperature. (Hot zone temperature as well as the average mean for the kiln.)

(2) Incipient surface calcination temperature. (Temperature at which calcination begins at the stone surface.)

(3) Interfacial lime temperature. (Temperature of the lime adjacent to the stone.)

(4) Interfacial stone temperature. (Temperature of the stone adjacent to the lime.)

(5) Core center temperature. (Has the core acquired its full preheat?)

(6) Interfacial temperature differential. (The temperature differential between lime and stone adjacent to active region.)

(7) Change of above during calcining zone progression. (Temperature relations will change for different depths.)

(8) Calcining depth. (Depth to which calcining zone needs to penetrate—thickness.)

(9) Calcining time. (The time required to complete the process of calcination.)

Lime—Heat Requirement Factors

(1) Stone chemical analysis as to carbonates. (High calcium limestone,

magnesite, dolomite, magnesitic dolomite.)

(2) Temperature of dissociation of the respective carbonates. (The magnesitic portions will calcine at lower temperatures.)

(3) Rate of dissociation of the respective carbonates. (The magnesia of some dolomites will calcine much more readily than others.)

(4) Extraneous matter: amount, nature and distribution. (Except for hydraulic lime, the greater the amount the worse for the lime, but required calcination time is less.)

(5) Extraneous matter: degree of combination with lime. (Degree of combination depends on nature, distribution, temperature and time.)

(6) Endothermic heat requirement. (Heat required for dissociation of carbonates.)

(7) Exothermic heat release. (Heat from possible combination of extraneous ingredients with lime.)

(8) Net endothermic heat requirement. (One should know also where the heat is required in the kilns. Magnesia calcines separately, high in the kiln.)

(9) Sensible heat requirement to reach calcining temperature. (The heat of preheating to the point of dissociation.)

(10) Sensible heat requirement as lime (overheating). (The several hundred degrees the lime is heated above calcining temperature.)

(11) Sensible heat loss. (Exodus of CO_2 from lime surface above calcining temperature.)

(12) Total heat absorbed. (The total of sensible and reaction heat.)

(13) Total heat transfer requirement. (The total heat to be imparted at different periods and different kiln levels.)

Heat Transmission Factors

(1) Gas mass velocity. (The higher the velocity is the greater is the capacity and the better the heat transfer.)

(2) Gas stream composition. (CO content determines temperature of incipient dissociation.)

(3) Uniformity of gas stream flow. (Unequal flow impairs kiln performance.)

(4) Temperature of the stream and mean temperature difference. (It is the mean temperature difference through the kiln that counts.)

(5) Surface conductance. (A factor of gas mass velocity and temperature difference. The film co-efficient.)

(6) Flame luminosity, radiant heat transmission. (Radiant heat transmission is not dependent on mass velocity.)

(7) Heat conducted or re-radiated by overheated lime. (Lime with core receives some heat from fully calcined overheated lime.)

Combustion Factors

(1) Temperature of air preheat. (This depends on the size and functioning of the lime cooler.)

(2) Manner of fuel injection. (Single or multi-level; there are many variations.)

(3) Cross-sectional uniformity of fuel introduction. (Relative uniformity must be attained in the calcining zone.)

(4) Excess air and its distribution. (Equally important to uniform fuel distribution.)

(5) Incomplete combustion loss at the calcining junction. (It is not the loss at the exhaust that counts.)

Through this whole article we emphasized items conducive to higher kiln capacity. However, always when the production rate is increased in the manner presented, kiln thermal efficiency is simultaneously improved.

(To be continued)

African Lime Plant

THE NORTHERN LIME CO., LTD., Johannesburg, South Africa, has announced plans to erect a single, modern, rotary kiln for lime production, with a capacity in excess of 100,000 tons of lime per year, as recently reported in *Limeographs*. The plant will be built adjacent to a large high-calcium limestone deposit at Silverstreams, about 100 miles west of Kimberley. The kiln and most of the quarrying equipment will be fabricated in South Africa. This reportedly will be Africa's first rotary kiln.

Alaskan Marl Deposits

THE GEOLOGICAL SURVEY has published a report on the occurrence of lime marl in the Wasilla area, southwest of Palmer, Alaska. The report indicates some of the material to be suitable for the manufacture of portland cement. However, the amount of satisfactory, high grade marl discovered to date is said to be insufficient for this purpose.

The report states that marl occurs in several localities in the Cook Inlet area in south-central Alaska, the most significant known deposits being those found in the Wasilla area, about 30 miles north of Anchorage. Here, marl has been deposited in three fresh-water lakes—Wasilla, Finger and Lucille Lakes. The marl in and adjacent to Wasilla and Finger Lakes attains thickness up to 21 ft.

The occurrence of marl in several south-central Alaskan localities has been known for many years. Some marl from Otter Lake, near Anchorage, has been calcined to produce lime for agricultural purposes. Plans for development of the Wasilla Lake deposit are now underway by a Wasilla firm. It will be used in the manufacture of rock dust. Another deposit of marl near the east shore of Big Lake is reported to have been used locally for agricultural purposes for many years.

The report has been placed on file for public examination in the Geological Survey offices in Washington, D.C.; San Francisco, Calif.; Juneau, Anchorage and Fairbanks, Alsaka; at the Bureau of Mines office in Anchorage; and the Territorial Department of Mines at Juneau. Also, a limited mimeographed edition has been prepared which may be obtained free on application to the Director, Geological Survey, Washington, D.C.

Gravel Company Sold

HARMAN SAND & GRAVEL CO., Tionesta, Penn., formerly owned by R. J. Harman, has been sold to Joseph Sherman, Hawthorne, Penn., and George Hunter, Sligo, Penn., who will operate the plant under the name of Tionesta Sand & Gravel, Inc.

Domestic Lime Sales

DOMESTIC SALES of open-market lime in 1952 nearly equaled the record output of 1951, according to a Bureau of Mines report. The following table shows lime sales by types and major uses, in short tons, as given by the Bureau of Mines:

	1952				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total Year
By types:					
Quicklime	1,555,795	1,313,829	1,394,533	1,683,244	5,947,401
Hydrated lime	431,403	503,038	469,505	419,198	1,823,144
Total lime*	1,987,198	1,816,867	1,864,038	2,102,442	7,770,545
By uses:					
Agricultural:					
Quicklime	9,610	18,927	18,424	12,807	59,868
Hydrated lime	48,974	73,617	39,749	26,953	189,293
Total	58,584	92,544	58,173	39,860	249,161
Building:					
Quicklime	47,271	55,191	57,374	48,942	208,778
Hydrated lime	206,768	246,096	254,400	213,469	920,733
Total	254,039	301,287	311,774	262,411	1,129,511
Chemical and other industrial:					
Quicklime	978,781	864,511	890,656	1,020,018	3,753,966
Hydrated lime	175,661	183,825	175,356	178,776	713,118
Total	1,154,442	1,047,836	1,066,012	1,198,794	4,467,084
Refractory (dead-burned dolomite)	520,133	375,200	428,079	601,377	1,924,789

*Approximately 60 percent of lime produced is high calcium and 40 percent high magnesium.

MERCHANDISE Production of Several Companies Through Sales Concern

Sand and gravel producers, having deposits of varying characteristics, sell output through a separate sales organization

By CHARLES E. BRADY

TWO GRAVEL PRODUCING COMPANIES in North Carolina about 15 years ago recognized the need of promoting the uses of and sales of gravel and sand, and decided to organize a gravel and sand sales company. This concern, the Material Sales Co., Salisbury, N.C., had as its first president and general manager the late B. V. Hedrick, contractor and gravel and sand producer, and a director in the National Sand and Gravel Association for many years.

Because the idea of an organization devoted solely to the purpose of merchandising gravel and sand was a new one, there have been a number of producing companies who have tried to "join the family" by placing their sales with Material Sales Co., but the additions to the family have come only after careful consideration of such important factors as type of material produced, rate of production, type and condition of equipment and reputation in the trade.

Two of the companies represented have plants located at the same point on the Seaboard Air Line Railway, but they ship 90 percent of their production by rail and are not near any sizeable city. Another plant on the Southern Railway trucks 90 percent of its production, being close to a large and growing city. A third plant is not on a railroad but is adjacent to a large military base. The primary purpose of installing this plant was to supply materials for construction on this military base. The materials produced at each of the three type plants mentioned are all called gravel and sand but there similarity ends. They range all the way from quartzite sand and gravel 99.8 percent pure SiO_2 to a chemically heterogeneous boulder deposit, and in size from ¾-in. to 6-in. top size and up to 6-ft. boulders.

What the Salesman Must Know

The ideal salesman for these materials should be able to discuss materials intelligently with railroad engineers, with ready-mixed concrete plants, with army engineers and so on. He should know something of the chemical and geological characteristics of the materials, and of course their physical characteristics and the abilities of the various plants to produce various sizes. Briefly, a salesman or his company should be able to answer any pertinent question about his materials or be in position to supply an answer shortly. We try to select salesmen with engineering backgrounds, then give them training in the N.S.G.A. laboratory, our state highway laboratory and in independent laboratories. Salesmen can draw a rough flow-sheet of any of the plants, and they know the relative tonnages and sizes produced. The potential market is surveyed, both as to the number of uses for our materials, and the tonnages for each use. All customers are cross-indexed alphabetically, according to type of business, and by cities. Every year this information is re-appraised and revised. Our salesmen then go into the field where our materials are actually being used. They stay on a bituminous paving job, for instance, until they are familiar with the entire procedure. A good rule in selling a product is never to supply it for any purpose for which it is not suited or where it will not do a good job. Once a firm establishes such a reputation, its work with specification bodies becomes much more pleasant and productive. Every effort should be made to open up every specification for which your material is suited. To summarize, our salesmen must be thoroughly familiar with the characteristics of the materials they are to sell, must know the capabilities of the plants as to production and sizes and must be kept informed as to tonnage booked and rate of production, then they can concentrate on selling the material moving slowly and not oversell some fast-moving size. All these requirements are basic. Of course, if we could order our salesmen by specification they would probably fit the following:

> Age, 26-30 years old, married, graduate in engineering, two or more years experience in highway department, contracting firm or allied work, neat in appearance, thorough in work, moderate or temperate in all habits, having a friendly or outgoing personality, possessed of an unusual amount of determination, and of course having a liking for traveling

It may appear that an unusual amount of importance is attributed to the salesman, but it is safe to say that nearly always the first impression and very often the lasting impression formed of a company is furnished by its salesmen.

Advantages of Central Office

Having a central sales office for a number of plants has many advantages, not the least of which is you are able to become acquainted with your customers. By representing four plants located over a large area many of our customers can be supplied regardless of their job locations. Instead of giving shipping instructions to four or five different plants, they know that by calling us we will see to it that they get the best materials from the cheapest source by the time they need it. Thus not only our salesmen but also our office employees

Excavating operations at another plant in the joint selling organization

know our customers, and look after their requirements. Many customers when they are estimating a job outside of our shipping area telephone us to get information as to where they should buy their materials—needless to say we give as much attention to these requests as we give to their telephoned orders.

Knowing your materials and your plants are important, but knowing your customers and their needs are the next logical steps. If you know your prospective customer and he knows and has confidence in you, then the chances are he will want to do business with your firm. Never spoil his confidence by selling him a material that does not fit his needs.

Annual Get-together Meeting

Seven years ago our firm initiated a stag house party at Myrtle Beach, S.C. At that time we had certain problems to work out in regards to state highway specifications. We did not know the people with whom we needed to discuss these problems and we felt our case might be heard more sympathetically if we knew these people and they knew us. Accordingly, in a large private home we held the first of what has now become an annual affair, to be held this spring in the old Ocean Forest Country Club. After two and one-half days of golfing, fishing, and bull sessions we not only knew these people better, but had found new friends with mutual interests. Let me state right here that these parties are not "come get drunk" parties. We get together men who are outstanding in their fields and under the most favorable circumstances introduce them to each other, to us, and to the top production personnel at our plants. We have been pleased to have as our guests officials from the Bureau of Public Roads, from the Highway Research Board, from the North Carolina and South Carolina state highway bodies, from the Portland Cement Association, representatives from the engineering departments of our railroads, outstanding contractors, ready-mixed concrete plant operators, concrete products manufacturers, and more than once we have been so extremely fortunate as to have as our guests Vince Ahearn, Stanton Walker and a president of the N.R.M.C.A. The Carolinas Ready Mix Concrete Association had its beginning at one of these meetings. Our firm learned more about bituminous mix specifications at these meetings than at any other time. But most important, everyone attending these meetings met and made new friends, solved some technical problems and became Walt, Bill, Ralph, Stan, and Frank to each other.

Fortunate indeed is the sales company that can get enough immediate tonnage sold so it can stop rushing after every carload order and make long range sales plans—in fact, we believe there should be a planning group (in our case this group consists of the heads of all the producing companies and the manager of the sales company). Several years ago North Carolina launched a $200,000,000 secondary road building program. We met and decided that a large volume of tonnage to be bought would be for traffic-bound macadam base material. This material was usually supplied by our crushed stone quarries and had the following gradation:

Passing 1½ in.	100%
1 in.	80-95%
½ in.	40-80%
No. 4	35-55%
No. 40	8-30%

Amount passing No. 200 sieve shall not exceed one half the percentage passing No. 40 sieve.

The stone quarries called this material "crusher run" and literally shipped whatever ran through their crushers set at the proper openings. The state specifications for this material were studied very closely, and we became convinced that by blending certain loam overburden prevalent at our Lilesville plants with our 1½-in. to No. 4 graded gravel that we would meet the specifications and open up a large potential sales area. Our first step was to have our loam (minus No. 4 binder material) checked by a soils laboratory for liquid limit and plasticity index. When these were found to be within the state's limits we sold the state a test job which we blended the hard way—that is by picking up the loam and gravel with a clamshell and combining the two on a stockpile. The job was a very successful one so our production manager designed a plant to control the quantities, blend the materials and load. The equipment consisted primarily of bins, conveyors, Syntron vibrators and feeders, the cost of which was soon repaid in new business. One of the nicest features of this tonnage was that 35 to 40 percent of it was loam we had been wasting. In the first few years we made this material, we sold several hundred thousand tons which was in addition to our regular tonnage.

After World War II roads in North Carolina as well as South Carolina were sadly in need of resurfacing. In-

Storage and loading-out facilities of one of the companies supplying Material Sales Co.

asmuch as the aggregate used in these states for all types of resurfacing is minus ¾ in., we decided after a horseback survey that the then existing plants would be unable to produce sufficient quantities of minus ¾ in. to take care of the accumulated demand. Therefore, acting in close cooperation with the production heads of our plants, we went so far as to triple our output of smaller sizes and build stockpiles against anticipated demand. The result was that we shipped gravel as far as 200 miles away from our plants and at our full price. One of our crushed stone competitors had to ride from his home town to his stone quarry over a road that was surfaced with our gravel.

Sell Sand to Concrete Plants

Selling sand from our Lilesville plants where we automatically produce from 30 to 40 cars daily sometimes becomes a problem. In order to assure ourselves a steady year-round volume we concentrated on ready-mixed concrete plants and concrete products manufacturers. Some of these plants were taking our coarse sand, 8 to 10 percent passing No. 50 and 0 to 2 percent passing No. 100, and blending it 50 percent with a natural fine bank sand. They found by doing this the resulting sand showed about 18 percent passing the No. 50 and 3 to 4 percent passing the No. 100. This mixed sand, in combination with our gravel or crushed stone, gave a better cement factor, thus more than off-setting the additional cost of manipulation plus the added freight rate charge of the bank sand. In cooperation with our plants we worked out a mechanical means of blending our mortar sand back into our coarse sand thus raising the amounts passing the No. 50 and the No. 100 sieves to the desired grading. We thus saved our customers the manipulation costs, the trouble of handling two sands, and at the same time increased our sand sales by 10 to 15 percent.

Some years ago, at one of the conventions, Mr. Protzeller made a report on his work with various railroad ballasts. What particularly interested us was that portion of his report dealing with the "choking" of a well-graded stone or gravel ballast by using a coarse sand. Roughly, he recommended a stone or gravel ballast uniformily graded from 2 in. or 1½ in. to No. 4, put in place, then choked back with a coarse sand. The purpose of adding this coarse sand was to eliminate excessive removal of the ballast for cleaning and for the purpose of holding in suspension the greatest percentage of a heavy rainfall so that it might be evaporated or dispelled by sunshine and air instead of penetrating and softening the subgrade. Working very closely with the Seaboard Air Line Railway, we supplied our coarse sand for several test sections. The results were so surprisingly good that we soon found ourselves embarrassingly low on sand. Again our plants worked in close harmony with us by increasing their sand production.

Inasmuch as the trend in our state highway department has been away from concrete pavement (although in North Carolina we have done and are still doing some concrete work), we began studying asphaltic mixes to see if we could compensate for the sand and gravel tonnage lost by lack of concrete pavement construction. It seems, at least in our area, that the critical gravel size for asphaltic hot mixes lies between the No. 4 and the No. 10 screens. Of course, for concrete purposes we consider everything above No. 4 to be gravel and everything below No. 4 to be sand. We experimented and found that certain proportions of our ⅜-in. down gravel, plus our coarse concrete sand, plus our loamy sand overburden gave an ideal mix for asphalt plants. We utilized the same blending equipment described in the foregoing paragraph about TBM material and uniformly mixed these three components and supplied the contractor a material which went directly into his asphalt plant bin. Thus, we eliminated the necessity for bringing in materials from two or three different sources and then combining them in the proper proportions—again we were selling a material (loamy over-burden) formerly wasted.

Metallurgical Market

Earlier we mentioned that it is well to become familiar with the chemical characteristics of your materials. It is not necessarily true that you will sell more material as a result of this knowledge, but sometimes a pleasant surprise awaits you. In our case we are selling all the plus 1-in. material of two of our plants for metallurgical purposes. This quartzite gravel analyzes 99.65 percent SiO_2, and has become increasingly important in making silicon, ferrochromesilicate, and ferro silicons. There have been at least two metallurgical plants located so as to advantageously use this material. The Non-Ferrous Alloys Division of the Bureau of Mines was helpful to us in building our prospect list of these metallurgical plants. Before World War II this tonnage was quite small, but today it represents one of the most important portions of our sales.

A gravel and sand sales company must render a number of routine services. Not the least of these is the systematic and thorough coverage we afford contractors with our written quotations. We check the Associated General Contractors weekly bulletin and quote every listed bidder on every job whose location is such that our materials can be economically supplied.

Because our outside activities place us in contact with specification writing bodies we find ourselves most often handling this phase of our work for our plants. By knowing what the plants can produce economically and what the customer needs in order to get a good job done, we often find it possible to effect slight alterations in specifications. Usually this makes for more efficient production by the plants and helps the customer to get a better job.

For many years now we have been most active in appearing before rate making bodies to present the case for gravel and sand. We have appeared some four or five times before our North Carolina Utilities Commission in intrastate rate hearings. The other producers in our area have never protested these rate increases requested by the railroads, taking the attitude they might offend the railroads—their ballast customers. We have never lost any ballast business through our policy, on the contrary we have been told, off the record, that the railroads are sympathetic with our position but for fear of prejudicing their entire case for increases they cannot afford to single out any one commodity for special treatment. Our many customers in North Carolina appreciate the fight we have waged to keep gravel and sand rates at a reasonable level.

Through cooperative conferences with the various railroads in the Southeast and the gravel and sand and stone producers from the same area we were able to devise a new gravel and sand scale several years ago. This scale was uniformly adopted interstate and intrastate throughout the Southeast, and represented a considerable reduction from the then prevailing interstate scale, and marked a signal victory for the gravel and sand producers in their long fight to be recognized as an industry loading a long-haul, heavy-loading, quick-turnaround, low-value commodity. This scale became known as the "New Orleans Scale," for it was adopted in New Orleans at a meeting of the railroads and producers.

Modern Office

(Continued from page 70)

improve working conditions during the summer months.

The Janesville Sand and Gravel Co. is very largely a family enterprise. J. K. Jensen is president of the company; his brother, J. R. Jensen is vice-president, superintendent, and engineer; Ellis Jensen, son of the president, is treasurer; and Fred Ehrlinger is secretary. The three sons of J. R. Jensen head divisions of the company; Earl Jensen is superintendent of plant No. 4, Roy Jensen is superintendent of plant No. 5, and Oscar Jensen is superintendent of the concrete block and ready-mixed concrete operations.

Indiana Mineral Aggregates Meeting

Status of A.C.P. federal appropriation, blasting legislation, paving materials research, and Indiana toll road progress were important topics covered at annual meeting in Indianapolis

PRODUCERS of crushed stone, slag, and sand and gravel met in Indianapolis, Ind., on March 19 and 20 to attend the annual meeting of the Indiana Mineral Aggregates Association, Inc., at the Claypool Hotel. A considerable number of producers in Ohio and Illinois also were present to boost the attendance to one of the largest on record.

Officers and directors elected were: president, C. W. Siniff, American Aggregates Corp., Indianapolis; vice-president, C. W. Bowen, Hy-Rock Products Co., Marengo; secretary-treasurer, M. G. Johnson, The Merom Gravel Co., Indianapolis; and Ralph Simpson, engineer-director. New directors are: E. P. Holwadel, Ohio Gravel Co., Cincinnati, Ohio; Robert Connell, Terre Haute Gravel Co., Terre Haute; Wm. Stonestreet, Stonestreet Gravel Co., Angola; R. A. Wilson, Connersville Gravel Co., Inc., Connersville; George Wheeler, Kirkpatrick Gravel Co., Cambridge City; C. A. Broecker, Newton County Stone Co., Kentland; Claude Monce, Meshberger Bros. Stone Corp., Linn Grove; R. E. Ward, The Francesville Stone Co., Inc., Francesville; N. E. Kelb, St. Paul Quarries, Inc., Indianapolis; Max Radcliff, Radcliff & Berry, Inc., Orleans; and R. L. Paulus, W. C. Babcock Construction Co., Inc., Rensselaer.

Ralph Simpson, engineer-director of the association, reviewed legislation in Indiana affecting the industry, and followed by introducing Bruce Hardy of Scottsburg who reported on the status of the A.C.P. program in Washington. Mr. Hardy pointed to the difficulties in holding appropriations in line for 1954 as both the American Farm Bureau and the Grange had gone on record favoring a reduction in these expenditures. He expressed the view that A.C.P. and P.M.A. may be merged, but he was hopeful that an appropriation exceeding $160,000,000 would be obtained for 1954.

Jules E. Jenkins of Vibration Measurement Engineers, Inc., presented a paper on "Blasting Legislation—Its Pitfalls and Benefits." He said that no objection could be raised to regulations designed to promote safety, but recent legislation restricting use of high explosives had not been very often practical or realistic in its application. He referred to a recent adverse decision of the Indiana courts. Mr. Jenkins pointed to Connecticut as one of the first states to have set up regulations covering blasting. Police used the pin machine to check complaints involving vibration damage. Residents have not made as many complaints since these pin tests have been made. He also referred to rules set up by Pennsylvania which finally decided on a .03 in. minimum displacement. The most recent study was that of New Jersey which gives weight to frequency displacement in its regulations.

"A Proposed Method to Evaluate Structural Properties of Paving Structures" was the subject of a talk by Wm. M. Aldous, chief, soils and surfacing branch, Technical Development Center, Civil Aeronautics Administration, Indianapolis. Mr. Aldous illustrated his talk with a number of slides. Equipment for his tests comprised a test subgrade slightly over 10 ft. square with 3600 metal plungers, each 2-in. square, and individually supported by a calibrated compression spring of known rate. Deflection of each supporting spring was measured to within an accuracy of .001 in. Various type, composition and thickness of base course and surfacing mixtures were constructed on this subgrade and loaded with selected load mediums. Mr. Aldous pointed out that this test equipment and method could be used in preliminary testing and investigation to employ the actual load medium for which the field structure would be designed. Prof. Ken Woods of Purdue said that Mr. Aldous studies pointed to a trend in testing which should be followed with interest.

Bruce Short, secretary, Indiana Toll Road Commission, reported on the progress of the Indiana toll road. He reported that preliminary surveys have been made and estimates of probable earnings from suggested tolls have been completed. It is expected that the new road will require 1,500,000 bbl. of cement, 1,500,000 tons of sand and 1,500,000 tons of coarse aggregate. It will be an entirely new right-of-way, 300 ft. wide. The road starts near Butler, Ind., and runs to the Indiana state line beyond Gary.

John B. Patton, chief, industrial minerals section, Indiana State Geological Survey, Bloomington, Ind., presented a very interesting talk on the "Character of Gravel and Sand Deposits in Indiana" which was illustrated by slides. His report was based on a study of 3000 deposits over 600 of which are being worked. A more complete paper appears elsewhere in this issue.

D. W. Lewis, research engineer, Joint Highway Research Project, Purdue University, described the extensive investigations of concrete durability which have been carried on in both the laboratory and the field. Performance surveys of over 2600 miles of concrete pavement built prior to 1935 established a statistically significant correlation between the source of aggregates and the occurrence of blowups, and D-line deterioration of the pavements. Early studies, principally on crushed stone, resulted in the following conclusions: (1) the principal cause of pavement deterioration is the action of freezing and thawing on concrete containing highly saturated and non-durable coarse aggregate; (2) freezing and thawing tests on concrete beams containing vacuum-saturated aggregates correlate with field performance; and (3) the degree of saturation of the aggregate under vacuum and the volume of pores having a diameter smaller than 0.005 mm. were correlated with both field performance and laboratory freezing and thawing tests.

Testing of fine sand aggregate in concrete specimens subjected to freezing and thawing tests showed that with air contents of 2 to 2½ percent or higher, all the fine aggregates showed excellent durability. The trouble developed in some of the coarse aggregates. Heavy-liquid separation provided a convenient means for separating the non-durable from the durable particles. Sandstone and chert were the principal deleterious constituents. The deleterious constituents are characterized by low specific gravity, high absorption and degree of saturation, and consequent lack of durability in freezing and thawing. The percentages of low specific gravity particles in the gravels were correlated with the field performance records of the sources.

Albert J. Wedeking, outgoing chairman of the State Highway Commission of Indiana, in his address talked about the prospects for 1953. He indicated a very large back-log of work to be done. Mr. Wedeking said that the commission could not function unless producers of materials and contractors worked to the end of producing a good finished product in the roads. He suggested more cooperation might be achieved by holding meetings between the highway commission and producers and contractors.

The convention concluded with a social hour and cocktails preceding the annual banquet in the evening. Marshall B. Abrams, managing director, Construction League of Indianapolis, was the principal speaker. The election of officers and business meeting was held on March 20.

GRADATION AND COMPOSITION of Indiana Gravels

By JOHN B. PATTON*

Sand and gravel deposits studied in Indiana to determine the effect of glaciation on distribution and variation of particle size, and presence of deleterious materials

THE RELATIONSHIP between gravel and continental glaciation is so intimate in the midwestern states that it is difficult to talk about the characteristics of gravels without plunging into the mode of their origin. Of the 92 counties in Indiana, only one (Orange County) has completely escaped the effects of glaciation. A sizable block of counties in south-central Indiana was never touched by the ice sheets themselves, but the effect of glaciation is apparent in most of them in the form of water-laid materials, of which sand and gravel constitute the greater part, that fill the valleys which acted as drainage channels for the water that melted from the ice. These meltwater channels are called sluiceways. In addition, extremely fine-grained material was blown from these drainageways during the recurrent periods when they were dry and was deposited over the land surface, generally in an eastward direction from the drainage channel, to form the blankets of material that we call loess.

*Principal geologist. Published with the permission of the State Geologist, Indiana Department of Conservation, Geological Survey. Presented at Indiana Mineral Aggregates Association annual meeting.

Survey Locates 3000 Pits

If proof was needed of the relationship between glaciation and gravel deposits, or of the wide-spread effects of glaciation in Indiana, it was obtained during 1949 and subsequent field seasons when field parties of the Geological Survey, Indiana Department of Conservation, located more than 3000 pits from which gravel, sand, or both were being removed or had been removed in the past. Of this number, more than 600 were active or active-on-demand at the time of inspection by the field parties. In this impressive evidence of mankind's tendency to excavate holes in the surface of the earth, not a single gravel pit was found that was not the result of glacial processes. Only a small proportion of the pits were in deposits laid down directly by the ice. Most of them were in deposits laid down by the melt waters from the ice sheets.

After the statistical information that resulted from our survey had been compiled and analyzed, some 90 localities were selected for sampling. Most of them were in the valley deposits of the major glacial streams and in broad expanses called outwash plains which resulted when the melt waters, laden with clay, sand and gravel, flowed out across level areas in which major drainageways had not yet developed. The samples were taken from pits within these two

(Continued on page 94)

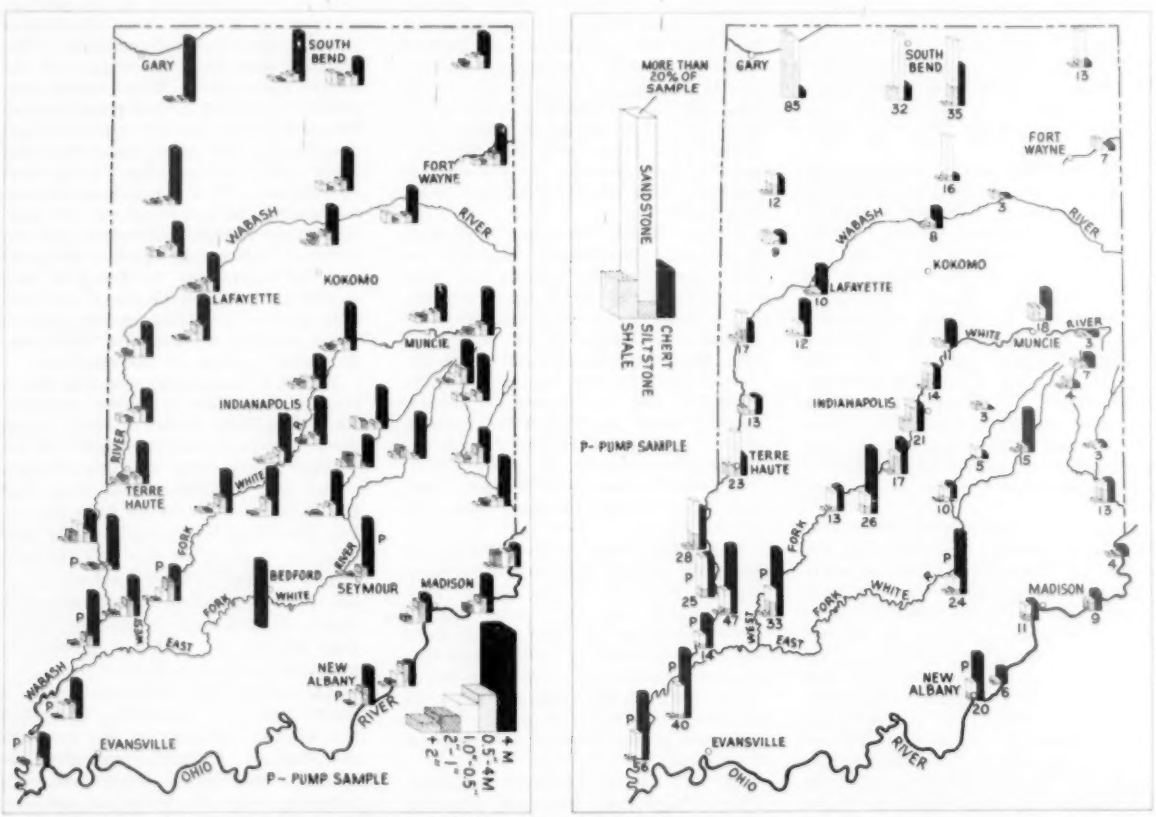


Fig. 1: Left, size gradation of selected gravel deposits in Indiana: Fig. 2: Right, relative amounts of selected deleterious materials. The number beneath each bar graph is the total percentage of the entire sample which falls in the four categories; chert, siltstone, sandstone and shale

P & H
LIMA
LORAIN
BAY CITY
MANITOWOC
UNIT
BUCYRUS-ERIE
NORTHWEST
KOEHRING
OSGOOD
INSLEY
LINK-BELT SPEEDER

When it's time to rebuild...
These great shovels deserve the best.

Stoody Hard-Facing Alloys

TEETH, ROLLS, IDLERS, TUMBLERS, PADS, BUCKET LIPS and similar wearing parts are easily kept in tip-top running condition with STOODY HARD-FACING ALLOYS.

The Guidebook shows how to repair wear damage quickly—make old shovel parts do the work of new! If you operate shovels and crawlers ask for your copy today... there is no charge!

STOODY COMPANY

11929 East Eleven Avenue, Whittier, Calif.

categories because it was believed that generalizations could be drawn only in the case of such wide-spread deposits. Each of the isolated gravel hills which dot the till plains of northern Indiana is a study in itself, and the results of analyzing such gravels are not applicable to other areas and probably not even to other gravel hills in the same areas.

Size Analysis

The samples collected in this program were subjected to analyses of two sorts. The first of these was size analysis and, for this purpose, the raw material was divided into five size gradations which were plus 2 in., 1 to 2 in., ½ to 1 in., 4 mesh to ½ in., and minus 4 mesh. These size ranges were selected after consultation with people experienced in the uses of gravel, as it was hoped that the results would be applicable to practical problems in the aggregates field.

The results of a selected number of these sieve analyses are shown on Fig. 1. To avoid overcrowding, about half of the analyses are omitted.

One of the principal difficulties encountered in making this study was the impossibility of obtaining truly representative samples of raw material in some areas. Notably these are the areas in which virtually all commercial gravel is produced by a suction pump. Oversize material is not picked up by such a pump and, more serious to our purpose, much of the fine material is carried away by the water so that the first material obtained from the system is beneficiated. This factor undoubtedly accounts for the relatively low sand to gravel ratio shown by the graphs for the lower reaches of the Wabash and the lowermost sample from the west fork of White River.

A great gap in the information is caused by the absence of commercial pits in the Ohio Valley downstream from Floyd County. Most of the gravel produced in this stretch of the Ohio Valley is produced by dredging, which also turns out material that has been highly processed by the time that it is first available for sampling.

Several generalizations can be drawn from the data presented in Fig. 1. Within a single glacial drainageway we know that material becomes progressively more fine-grained in the downstream direction. This effect is caused by two factors. The first is the size reduction that results from stream abrasion. The particles are simply reduced in size by the grinding action as they are transported downstream. Secondly, the finer-grained materials are carried a greater distance by the water. As the stream broadens and increases in size, its carrying power is likely to be reduced even though the total volume of water is greater, as the channel is larger in relation to the amount of water, resulting in decreased stream velocity. Some of the drainageways shown in Fig. 1 are good examples of this phenomenon. In the upper reaches of the streams which flow together to form the east fork of White River, sand-to-gravel ratio is about 60 to 40. After the tributaries have joined to form the main stream, the ratio increases to about 85 to 15. Thus, it is not by accident that the Seymour area produces a large part of the fine aggregates for many surrounding counties in south-central Indiana. The only sample obtained farther downstream in the east fork is in the Bedford area, where the sand-to-gravel ratio is so close to 100 to 0 that only sand can be shown on a generalized graph of this sort.

Similarly, in the west fork of White River, the sand-to-gravel ratio in the area upstream from Indianapolis is noticeably lower than in the downstream area. At the lowermost sampling locality of this glacial drainageway (in Daviess County), the sand ratio indicated would be much higher if this were a bank sample instead of a pump sample.

In the Wabash sluiceway, the sand-to-gravel ratio begins to climb noticeably south of Terre Haute, and again the bar graphs would show a more progressive increase in sand content if the samples were obtained by dragline or shovel instead of by pumping.

To some extent the gravel operators themselves have frustrated our attempts to show this progressive decrease in average particle size by their success in locating their pits where the size gradation is abnormal for the position in the sluiceway. Gravel operators, in general, have shown greater interest in establishing a successful commercial operation than in contributing data that will illustrate geologic principles.

In extreme northwestern Indiana, extremely unfavorable sand-to-gravel ratios appear in Porter and Jasper Counties. The area is noted for a scarcity of satisfactory gravels.

One of the principal points to be gained from this display of data is that different gravel producers operate in a wide variety of deposits, so far as size gradation is concerned, and that they must all meet the same set of specifications if they are to furnish materials for specification work. To belabor the point, one gravel operator may meet size specifications with half the effort and half the waste product required of his competitor.

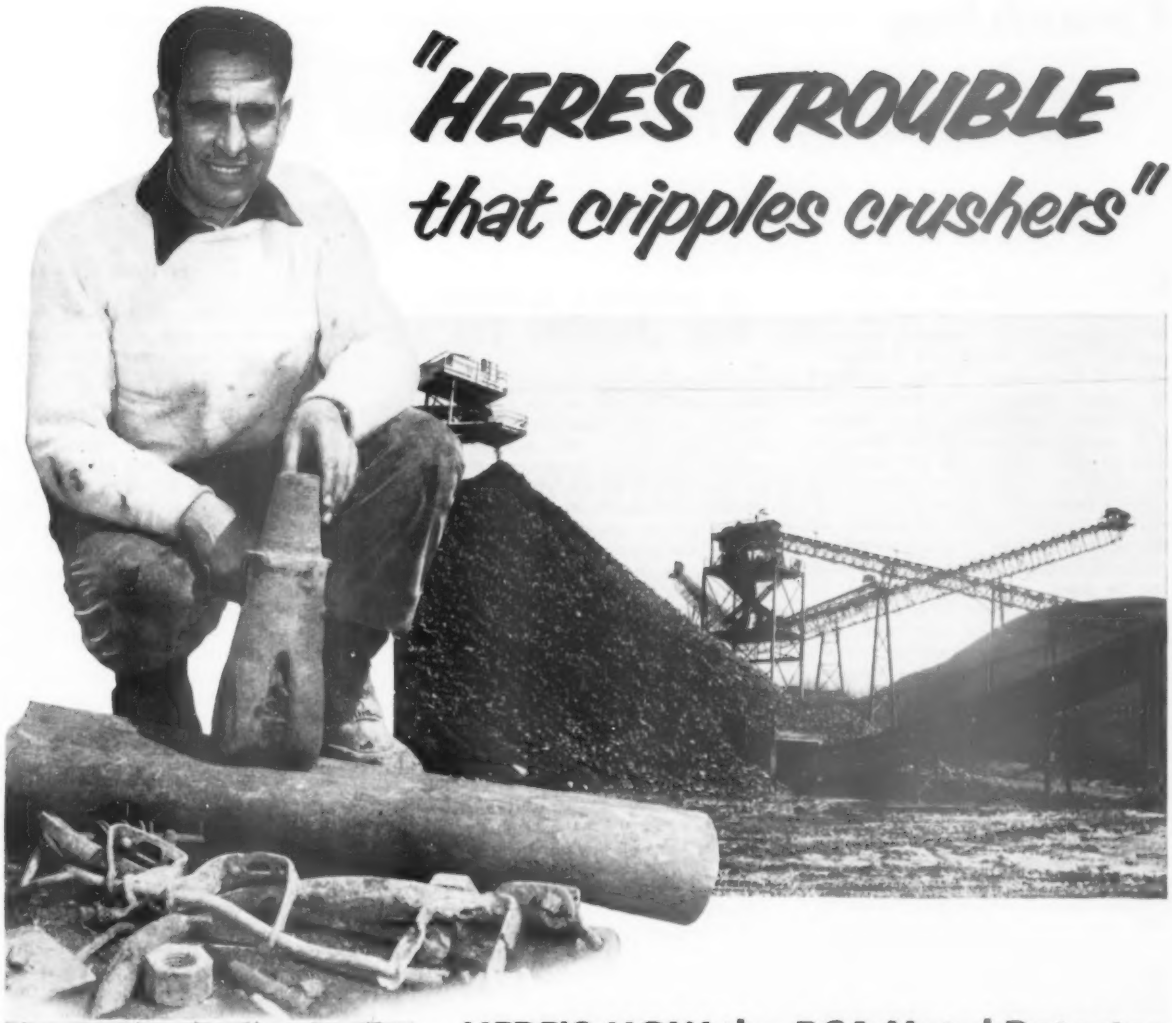
Lithologic Analysis

Each of the sieve sizes, except the sand fraction, was analyzed separately for its rock content. This is what is termed a lithologic analysis, and is made largely by visual identification of each particle under a low-powered microscope, aided by such simple tests as acid reactions and hardness determinations. The rocks are classified genetically; that is, they are subdivided on the basis of their mode of origin. All rocks fall into one of three general classes: the igneous rocks, formed by solidification from a molten fluid; the sedimentary rocks, which are those deposited as sediments by water, wind, and ice; and the metamorphic rocks, which are those that have been altered by heat or pressure from pre-existing igneous or sedimentary rocks, or even from pre-existing metamorphic rocks. Within the igneous category each sample was separated into about eight groups, the most common of which is granite. The sedimentary rocks were also divided into six or eight groups, the number depending upon the complexity of the sample. The sedimentary rocks were divided into

(Continued on page 114)

Showing torrential crossbedding in gravel deposits of the Wabash sluiceway at the Caley gravel pit west of Huntington, Ind. This illustrates the great diversity of particle size

"HERE'S TROUBLE that cripples crushers"



At Kingston Trap Rock Company, Kingston, N. J., the RCA Metal Detector is on the job, cutting shutdowns and saving crushers by preventing damage from tramp metal.

HERE'S HOW the RCA Metal Detector CUTS CRUSHER SHUTDOWNS

Extra-hard tool steels—bits, digger teeth, and other tramp metal—have ways of getting past even the most conscientious inspector—*but they can't escape the RCA Electronic Metal Detector.*

Installed on your conveyor, the RCA Metal Detector probes through rock to locate metals and alloys (including hard-to-detect manganese)—sounds an alarm or stops your conveyor—to keep trouble away from your crushers.

PAYS ITS WAY AGAIN AND AGAIN

By saving high-cost crusher replacements—by preventing the waste of shutdowns—the RCA Metal Detector can actually pay its way every day in the week. Start cutting shutdowns now—send for information today.

RCA

INDUSTRIAL PRODUCTS

RADIO CORPORATION of AMERICA

ENGINEERING PRODUCTS DEPARTMENT *CAMDEN, N.J.*

In Canada: RCA VICTOR Company, Limited, Montreal

RCA Engineering Products
Dept. 206Q, Camden, New Jersey

Please send me information on the RCA Metal Detector.

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

Crushing Practice and Theory

Part XV. Selection of secondary and reduction crushers

By BROWNELL McGREW*

BEFORE GOING into a discussion of the stages following the primary crusher or crushers we should like to interject a few comments regarding the titles which are applied—some of them more or less loosely—to crushers and crushing stages.

The term "secondary" has become well established and familiar through long usage; it applies to the crushing stage, either single or multiple, which follows immediately after the primary crusher, taking all or a portion of the product of the primary crushing stage as its feed. The term should not be used, as it sometimes is, to designate a particular type or size of crusher because any type and size might conceivably be used for secondary crushing. A very large number of secondary crushers in our present-day plants were originally primary crushers in those same plants. "Secondary" and "second-stage" are synonymous, and are equally good and descriptive definitions.

The word "tertiary" has been used rather extensively in recent years to cover not only third-stage crushers, but in a more general sense to delineate any and all crushers in the reduction and fine-reduction classes—a use which certainly takes liberties with the intent of the word. It is a legitimate term as applied strictly to a third stage of reduction, just as "quaternary" may be used to designate a fourth stage. Our own preference is to designate these successive reductions as "third-stage," "fourth-stage," and so on, and to identify the crushers themselves by the titles which usage has conferred upon them.

"Reduction-crushers" and "reduction-crushing," through the same authority of common usage, have been narrowed from the broad scope of their definitions to delineate reductions in the intermediate sizes of product, loosely in the range between 3-in. and 1-in. screen sizes. "Fine-reduction," in the same fashion, has come to cover the production of sizes in the range below 1 in., or there-abouts. More recently still, the "fine crusher" has been introduced to extend the application of the gyratory type down into that borderland between crushing and grinding formerly monopolized by the crushing rolls and the hammermill.

Secondary Crushing Stage

The simplest form of secondary crushing stage involves a single crusher, taking its feed by gravity flow direct from the primary with no interposed scalping separation. This is tantamount to making the over-all reduction in one machine, except of course that there will always be a certain amount of surge capacity between the two crushers. This type of installation has been used in a number of plants, starting with the advent of the power shovel and the large primary crusher, many of which were "tacked on" to existing plants during the conversion from hand-loading to shovel-loading operation. Probably the most notable of such installations were those of the first jaw crushers of the 84-in. class. These big machines were designed to operate at rather coarse discharge settings, usually from 10 to 12 in., and the usual practice was to follow them with gyratory crushers such as the No. 9 (21 in.) or No. 10 (24 in.), the over-all ratio-of-reduction for the two machines being 14 or 15 to 1.

The simple two-crusher, screenless arrangement works out fairly well for the large sizes of primary jaw crushers if the quarry-run rock is reasonably clean, or if any fine material which may be present in the feed is free flowing. The arrangement is not advisable under any circumstances if the setting of the secondary crusher is to be less than about 5 in.; for finer settings than this the fines produced through the two stages are apt to promote a sluggish action in the secondary machine, which might under certain conditions build up to a complete choke in this stage. So far as the commercial crushed stone plant is concerned the method violates the well established and very desirable principle of scalping off fines between all crushing stages in order to minimize further production of fines by attrition. The safest practice in all cases is to scalp between the primary and secondary stages regardless of the sizes of crushers used or their discharge settings. A plain grizzly is better than nothing; a modern heavy-duty vibrating screen is the ideal heavy-duty scalper.

Three factors are of prime importance in selecting the size and type of the secondary crusher, or crushers: (1) capacity; (2) size of feed, (3) size of product.

We might add to these the item of product characteristic, which embraces shape characteristic, and gradation. These are not always important, but they are sometimes very much so.

Capacity of Secondary Stage

The capacity of the secondary crushing stage need not necessarily match that of the primary crusher; more often than not it can be substantially less, for reasons outlined in the preceding section. It must of course be adequate to handle its share of the total plant capacity. How much its capacity should exceed the average plant capacity will depend upon how the job is engineered.

If the installation is of the simple "one-two" variety we have just described, and very little surge capacity is provided between the two stages, the capacity of the secondary stage should at least equal that of the primary; otherwise the quarry equipment may be held up at times, waiting on the secondary crushing stage to clear itself. If, on the other hand, an adequate surge is provided to take care of the inevitable fluctuations in feed-rate to the primary, the capacity of the secondary stage may be predicated on requirements of the succeeding stages. This presupposes that the secondary machine or machines will be large enough to eliminate delays due to bridging or blocking of the feed from the primary.

If scalping between the two stages is resorted to, the rating of the secondary stage may be reduced by whatever amount of undersize material is to be removed from the product of the primary. This can be determined within reasonably close limits by means of the product-gradation curves we have presented. In making this calculation it should be remembered that the scalping screen, regardless of type or size, will not remove all of the undersize. From 85 to 90 percent efficiency is the usual range, therefore the 10 or 15 percent undersize which will be carried over must be added to the theoretical tonnage, as figured from the curves, in arriving at the estimated feed to the secondary stage.

Once the required capacity for the secondary stage has been determined, it may be checked against tabulated ratings, at the desired discharge setting, for the type of crusher being considered for the stage. In making this check it should be remembered

(Continued on page 102)

*Allis-Chalmers Manufacturing Co., Los Angeles, Calif., district office.

KENNEDY

Machinery and Equipment

for cement, lime and mining plants

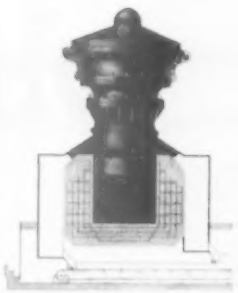
...IN USE THE WORLD OVER

Good machinery just doesn't happen! It is the result of sound design, engineering and manufacture . . . the kind of facilities which distinguish all KVS products . . . world-famous for their mechanical excellence and economy of operation.

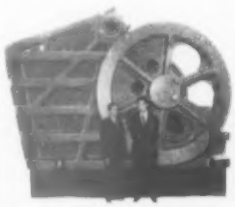
In their Danville, Pa. plant, occupying over 20 acres of space, KVS manufactures everything from a crusher to a complete cement, lime, or mining plant. The importance of world-wide experience in designing and building machinery and equipment which delivers maximum output at lowest operating costs is demonstrated in every KVS installation.

Whether your requirements call for the addition or replacement of a single piece of equipment, the modernization of an existing layout or the building of a complete plant for the manufacture of cement, lime or mining operations, Kennedy engineers are at your service to assist in planning, creating and specifying the installation best suited to your needs.

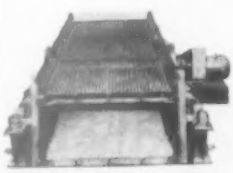
KVS engineers are available for consultation anywhere in the world. We invite your inquiries regarding our machinery and equipment . . . literature is available upon request . . . to help you determine the BEST method of solving your individual problems. Get the KVS story before you specify!



Gyratory Crusher, primary and secondary types, with double discharge outlets.



Swing Jaw Crushers: Heavy duty models, reversible jaws.



Vibrating Screens: Four-way motion; removable mesh; single, double or triple deck models.

Kennedy Stratified Air Swept Tube Mill.

Kilns, Coolers, Dryers: Built sectionally; any length or diameter.

IT COSTS LESS.. TO OWN THE BEST!

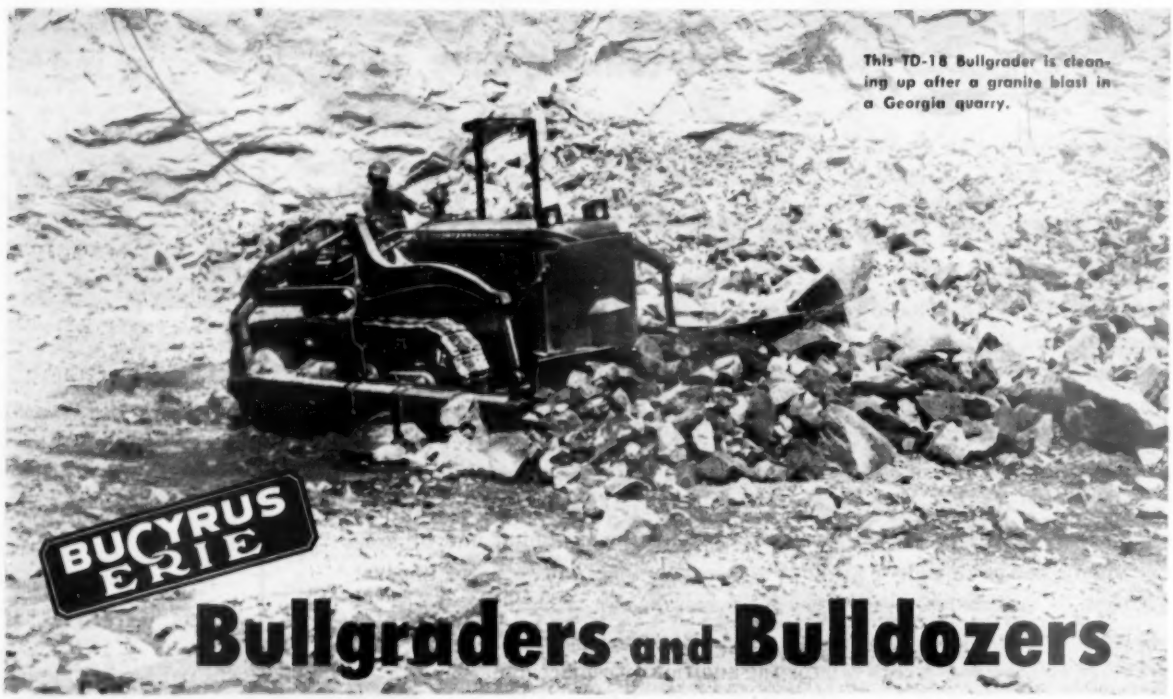
KENNEDY - VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION

TWO PARK AVENUE, NEW YORK

***FACTORY* DANVILLE, PA.**

why Bucyrus-Eries wear longer . . .



This TD-18 Bullgrader is cleaning up after a granite blast in a Georgia quarry.

Bucyrus-Erie blades are proving day after day, in quarries everywhere, that they're built to last longer and deliver dependable performance. Here are just a few of the reasons why:

EXTRA-TOUGH CUTTING EDGE . . . special wear-resistant alloy steel edge is securely bolted to the blade with tough alloy steel plow bolts.

RIGID BRACING . . . moldboard backs are reinforced at top and bottom with flanged beams for sufficient rigidity to resist distortion.

STRESS-RESISTANT MAIN FRAME . . . box section main frame is a welded unit with castings at the corners to withstand extra stresses.

LONG-LIFE CORNER SHOES . . . replaceable cast alloy steel corner shoes are heat treated and hard surfaced to make a long-wearing facing.

BALANCED DESIGN . . . blade attachments are designed specifically for International crawler tractors to maintain balance for full tractive effort. No balance-upset to cause loss of traction and excessive wear. Loads are put where tractor is designed to take them.

31T53

BUCYRUS-ERIE COMPANY SOUTH MILWAUKEE, WISCONSIN

SEE YOUR INTERNATIONAL INDUSTRIAL TRACTOR DISTRIBUTOR

INFORMATION

TO HELP YOU MEET TODAY'S PROBLEMS AND TO MAKE PLANS FOR TOMORROW

You can obtain catalogs listed on these pages by merely checking and mailing the coupon below

1 **AIR-ENTRAINING**—A. C. Horn Co., Inc. has issued an illustrated, 15-page booklet on "Ayr-Trap", an air-entraining agent, describing its principal uses, functions, advantages and effects. Charts giving results of tests are included.

2 AIR HOSE—B. F. Goodrich Co. has published catalog section 3460 describing its five grades of air hose. Specifications are listed and materials and methods used in construction are described, along with recommended uses for the various types of air hose.

3 **BATCHING PLANT**—Heltzel Steel Form & Iron Co. has released Bulletin N-33 describing specifications for 2- or 3-compartment portable batching plants of 30- or 45-ton capacities, which can be equipped with dual aggregate, truck mixing or universal batchers.

4 **BELT CONVEYORS**—Jeffrey Manufacturing Co. has released Catalog 852, describing and illustrating its line of belt conveyors. Typical applications, dimensions, capacities and engineering design data are given. Anti-friction idlers, belting, trippers, terminal pulleys, take-ups, backstops and belt cleaners are also listed.

5 BURNER, GAS AND OIL—Coen Co. has published Bulletin P-152 illustrating and describing its packaged Pac-O-Matic oil, gas and combination gas and oil burners for industrial, process and institutional heat and power. Constructional features are listed, and selection of components which make up the machine is discussed. A specification sheet is given and a performance chart is included.

6 **CLEANING SYSTEM** — Lamson Corp., Billmyre Blower Div., has issued Bulletin D-5, a 20-page booklet describing its Lamson Exidust central vacuum cleaning system. Diagrams, photos, design features, details and engineering data are given.

7 CONCRETE WATERPROOFING — American Bitumuls & Asphalt Co. has issued a laboratory report covering tests conducted on Hydropel, an integral waterproofing for concrete, showing effective resistance to moisture. Mixing data and tables along with compressive strength, water absorption, abrasion resistance and salt soundness tests are included.

8 CONTROL CENTERS — Westinghouse Electric Corp. has released operation booklet B-5621 on control centers. The booklet discusses the characteristics of control centers in regard to flexibility of application, ease of servicing and safety of operating personnel. Three types of control centers are described, and the various electrical components that make up typical units are illustrated and defined. A three-step building-block system of planning control centers, check charts and reference tables are also given.

9 **CONTROL VALVES** — Ross Operating Valve Co. has released a 12-page illustrated booklet describing air power and air control valves. Colored diagrams and list of available models are included.

10 **CONVEYORS**—Jeffrey Manufacturing Co. has issued Catalog 851 listing its line of spiral conveyors and fittings. Sectional flight, helicoid, mixer, cut flight, ribbon and cast iron types are listed along with horsepower formula, selection and capacity tables.

11 **DIESEL ENGINE** — Ingersoll-Rand Co. has released Form 10027 which discusses its TS diesel engine. Drawings, installation views, and diagrams of the heavy-duty engine are included. Specifications, weights, performance curves, and dimension tables are also given.

12 **DUMP BODIES**—The Galion Allsteel Body Co. has issued catalog L-6512 describing its line of dump bodies, hydraulic hoists and end loaders. The catalog includes a reference table, action photographs, engineering diagrams, technical data information and mechanical specifications. Equipment ranges from light duty pick-up truck units to large twin telescopic, 3-stage tandem axle trailer dumps.

13 **DUST COLLECTOR** — Pulverizing Machinery Co. has released a booklet describing the Mikro dust collector. Principles of operation, specifications and dimension reference sheets are given. Typical application photographs and drawings are also included.

14 **EARTHMOVING EQUIPMENT**—S. K. Wellman Co. has announced four catalogs covering replacement and installation data on friction parts for earthmoving equipment. Allis-Chalmers equipment, Caterpillar applications, International-Harvester parts, and Le Tourneau equipment are shown. Make and model information, parts specifications, ordering instructions and installation data are also listed.

15 **FORK TRUCKS**—Elwell-Parker Electric Co. has compiled a 12-pg. manual, illustrating and describing its line of platform and fork trucks and floor cranes. Construction features, operating photographs and specification details are given of the equipment and various attachments.

16 **GEAR DRIVES**—Link-Belt Co. has issued a 36-page booklet, 2519, describing herringbone gear drives. Engineering, horsepower rating and load and drive tables are given along with typical installation illustrations. Also included are selection instructions.

17 **GENERATORS** — Allis-Chalmers Manufacturing Co. has prepared a motor and generator reference book as an aid in the selection of motive power for handling industrial operations. The 50-pg. pamphlet, No. 51R7933, includes illustrations on integral horsepower motors and generators and lists methods of speed control, torque requirements, motor dimensions, performance data, etc.

18 **HEATING SYSTEMS** — The Flexicore Co., Inc., has issued a folder on "The Flexicore Split System of Warm Air Panel Heating." Single duct and counterflow systems are illustrated, including diagrams of air flow and installation details. Also described is the use of the hollow cores of precast concrete slabs as structural floor circulating warm air system ducts and panel heating units.

19 **HOISTS**—Sauerman Brothers, Inc., has issued General Catalog, section N, listing and illustrating its line of roller bearing hoists for scraper storage, scraper excavating, tautline cableway and slackline cableway machines. Brake and clutch controls for hoists are also described.

20 **HYDRAULIC DRIVES**—Twin Disc Clutch Co. has published a 31-page booklet "Production Road" describing and illustrating hydraulic drives. Descriptions and comparisons between hydraulic couplings and hydraulic torque converters are also included.

21 INSULATION—Industrial Mineral Fiber Institute has released Vol. X, No. 4 of its publication "Efficiency." The booklet illustrates various insulation layouts. Titles and synopses of other literature on insulation are also listed.

22 **JAW CRUSHERS**—Diamond Iron Works, Inc., has released a bulletin listing details and specifications of its 11 crushers. A capacity table, percentage chart and various rock toughness details are given. Cut-away views and illustrations are also included.

23 LOADING DOCK RAMPS—Rowe Methods, Inc., describes and illustrates its Adjust-A-Dock and Adjust-A-Truck, loading dock ramps, in a 4-pg. brochure. Installation and operation details along with construction features are given. Application photographs and drawings are also included.

24 MAGNETS — Eriez Manufacturing Co. has announced distribution of a chart describing natural forces causing magnetism and how they are harnessed. Diagrams and drawings with explanatory captions are shown.

Fill Out Reverse Side — MAIL TODAY

FIRST CLASS
PERMIT NO. 1417
Sec. 34.9 P.L.&R.
CHICAGO, ILL.

BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

–POSTAGE WILL BE PAID BY–

ROCK PRODUCTS

309 WEST JACKSON BOULEVARD

CHICAGO 6, ILL.

FREE!

Information on

NEW LITERATURE

about your business

USE COUPON BELOW

25 MATERIAL HANDLING — Lull Manufacturing Co. has released a booklet on its hydraulic Traveloader. Loading procedure is illustrated, construction features are listed and accessory equipment is shown. A detailed specification sheet is included.

26 MINING TOOLS—Kennametal, Inc., has published Catalog M-7 containing specifications, prices and application data of its carbide-tipped mining tools and accessories. Cutter bits, drill bits, rock bits, open-pit bits, augers, adapters, drive sockets, etc. are listed and illustrated. A price book and a pamphlet on cutting and drilling costs are inserted in envelopes in the back section of the catalog.

27 MOTOR GRADERS—Caterpillar Tractor Co. illustrates and describes 15 attachments for its motor grader in Form 30663. The eight-page booklet features a complete listing of 20 various attachments along with pictures and discussions concerning the 15 which are manufactured by the company.

28 NUTS AND COLLARS—Standard Pressed Steel Co. has prepared two four-page bulletins, one on self-locking nuts and the other on steel shaft collars. Product properties and applications are discussed and illustrated. Available sizes and metals are listed along with typical application illustrations for various industries.

29 PIPE JOINT SEAL—The Philip Carey Manufacturing Co. has released a folder on Sewertite joint compound. A four-step pictorial explanation on applications is given with a description of the compound and the various uses. Also included is a table of quantities required for bell and spigot joints and tongue and grove pipe.

30 POWER DISTRIBUTION—General Electric Co. has announced Bulletin GEA-5900, comprising 28 pages with illustrations, which may serve as a guide to modern plant, electric power, distribution practices. Use of feeder switches, starters and fuses, grounding of systems, application of capacitors, etc., are discussed. Diagrams on various systems are also included.

31 PULVERIZER — Majac Engineering Co. has released bulletin entitled "The New Art in Industrial Pulverizing," describing and illustrating the Majac jet pulverizer for limestone, mica, perlite, feldspar, coal and coke. Large cutaway view, detailed information and technical data on the engineering, assembly and operation of the pulverizer are also included.

32 PUMPS—The Gorman-Rupp Co. has released individual folders describing its line of self-priming centrifugal pumps ranging in capacity from 2 to 10 in. Performance tables are shown for the various pumps, as well as engineering information. Pump selection tables are also given.

33 PUMPS—Rice Pump and Machine Co. has announced Bulletin 52, which gives details and specifications of all models of portable, self-priming centrifugal pumps. New developments are illustrated by a sectional view.

34 PYROMETER CONTROLLER — The Bristol Co. has published bulletin No. P1248 discussing its recently-announced free-vane electronic pyrometer controllers. The bulletin illustrates the construction of the units and describes their uses for various control. Specifications and full-size reproductions of temperature scales are given. The features of a proportional input control model are also discussed.

35 SAFETY POSTERS — National Safety Council has issued its 1953 illustrated directory of occupational safety posters for use in various industrial fields including quarries, cement and construction operations. Serious and humorous posters are available in two or more colors. Miniature posters for payroll enclosure, poster frames, billboard displays and 25- x 38-in. posters are also described.

36 SCREENING PLANT — Kolman Manufacturing Co. has issued two bulletins, 109-SCR and 101, illustrating and describing its line of vibrating screens and conveyors, respectively. The conveyor equipped with the vibrating screen makes a complete screening plant. Typical applications, specifications and a chart of available sizes and models are also included.

37 SCREW CONVEYORS — Link-Belt Co. has released a 92-page book, No. 2289, describing and illustrating screw conveyors and feeders. Typical applications are illustrated and specification, engineering and installation data are given. Selection tables and horsepower formulas are also included.

38 SHEAVES—Fort Worth Steel & Machinery Co. gives dimensions and weights of QD-V-belt sheaves and hubs in specification guide No. 83. Construction features are described through cut-away photographs and installation and removal instructions are illustrated by pictorial panels. Tables and line drawings are also included.

39 STEAM GENERATORS — Malsbary Manufacturing Co. describes the application and advantages of its steam generators in a 4-page folder, through specifications, charts, and construction details of steam curing.

40 TECHNOLOGY REPORT—Armour Research Foundation of Illinois Institute of Technology has compiled its 1952 Technology Center Annual Report. Research activities on low-temperature sintering, dust analysis, blast effects, corrosion, etc., are discussed. Activities of various divisions of the institute are also given including the Engineering Mechanics Division and the Materials and Processes Division. Photographs of the center at work are shown throughout the 60-pg. book.

41 TORQUE CONVERTER — General Motors Corp., Detroit Diesel Engine Div., tells the inside story of torque convertor units in an illustrated folder. Cutaway drawings, curves, and typical applications are combined to explain the operating principles of the units.

42 TRACTOR—The Oliver Corp. has available a catalog explaining the operation and features of its "OC-18" industrial tractor. Application photographs, diagrams, specifications and sketches are included.

43 TRUCK MIXERS—Cook Bros. Equipment Co. has issued a 20-pg. illustrated brochure giving details and specifications on its Challenge line of truck mixers.

44 GRINDING MILLS—Hardinge Co., Inc., has issued Bulletin 18-B and AH-440 describing its line of tube mills and grinding mills respectively. The catalogs discuss the applications, construction and specifications of the mills with equipment illustrations and drawings.

45 V-BELTS—Thermoid Co. has issued an 8-page catalog on V-Belts for industrial use. Simplified conversion tables, prices, dimensions, weights and construction details are presented.

46 WATER HOSE—B. F. Goodrich Co. has published a four-page Catalog 4800 describing the various uses of water hose, including operation in road building, construction projects, mines and quarries. Specifications and hose illustrations are also given.

47 WIRE ROPE—American Chain & Cable Co., Inc., American Cable Div., has released a 16-page wire rope Booklet DH-128B for use by general contractors. This illustrated booklet contains wire rope recommendations for various types of bulldozers, back fillers, angle dozers, skimmers, etc.

48 WIRE ROPE SLINGS—A. Leschen & Sons Rope Co. has made available a 64-pg. Handbook FS-52 on its slings and fittings. Job applications and the various type slings and fittings are illustrated. Calculation charts and drawings are also given.

Detach and Send Us This Post Card

ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago, Ill. (5-53)

I would like to have the items circled

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48		

(Please print or typewrite name and address)

Name_____ (Position)_____

Company_____

Street_____

City & State_____

PAYLOADER *WORKS ANYWHERE*

4-WHEEL DRIVE GIVES TRACTION, MOBILITY AND VERSATILITY!

Load! Dig! Strip! Carry! Stockpile! Lift! Pull! Push! — all these operations are everyday tasks for big versatile "PAYLOADERS" — makes them valuable for small or large operations. Their mobility and travel speed up to 20 mph enables them to travel quickly between scattered jobs.

These "PAYLOADERS" feature large pneumatic tires, 4-wheel-drive, proper weight distribution and power-boosted steer. Other outstanding advantages are full, double-acting hydraulic bucket control, automatic tip-back bucket and four speeds in *both* directions. Sales *and* service are available from 200 "PAYLOADER" Distributors in the U. S. and Canada. See yours for full details or write The Frank G. Hough Co., 705 Sunnyside Ave., Libertyville, Ill.

CATALOGS are available on any "PAYLOADER": 4-wheel-drive Models HM — 1½ cu. yd. and HK — 1 cu. yd.; rear-wheel drive Models HY — 1¼ yd., HF — ¾ yd., HE — ½ yd.; front-wheel-drive Models HAH — ½ yd., HA — ½ cu. ft.

Power-boosted steer for easy handling in sand and mud

Big tires and 4-wheel-drive for traction and flotation

Travel Speeds up to 20 MPH

PAYLOADER®

THE FRANK G. HOUGH CO. · Since 1930

(Continued from page 96)

that capacity tables, while they are prepared on a conservative basis, are predicated upon a *uniform* rate of feed—and upon the assumption that the crusher is in first-class condition.

If for any reason it is expected that the feed rate will not be uniform, adequate allowance should be made for whatever degree of fluctuation is anticipated, just as was suggested for the primary crusher. Also, inasmuch as it is to be expected that some drop in efficiency of the crushers will occur from time to time because of mechanical conditions, some allowance should be made for this, regardless of whether or not the feed rate will be uniform. From 10 to 15 percent will be sufficient for this in a properly maintained plant.

Surge storage between the primary and secondary stages, while always theoretically desirable, may not always be practicable or economical. The product of the very large sizes of jaw crusher, for example, may be so coarse and slabby that it would be exceedingly difficult to handle through a surge bin or on mechanical feeders of reasonable size and cost. Therefore, where these large jaw crushers comprise the primary stage, it is generally best to consider the two stages as a unit and to match their capacities closely enough so that the material can be kept on the move—providing only a small open surge space between them. Then, if surge storage is desired it may be incorporated in the flow line after the secondary stage. The product of the largest sizes of gyratory crushers can be handled satisfactorily through storage.

Size of Feed

If the secondary stage is to consist of one or more standard type gyratory crushers, with or without non-choking concaves, the radial receiving opening should be not less than 2½ to 3 times the open-side discharge setting of the primary crusher. The larger ratio should be observed for primary jaw crushers, because of the slabbing propensities of this type. Thus, if the primary is one of the 84-in. class of jaw crushers set at 10 in., the secondary machine should be not less than a 30-in. gyratory with straight concaves, or a 36-in. size if fitted with non-choking concaves (32-in. receiving opening). A primary gyratory, set at 6 in., may be followed by one or more 16-in. crushers with straight concaves, or by the 20-in. size if fitted with non-choking concaves (16½-in. receiving opening).

When the secondary stage is to consist of gyratory crushers of the reduction type, such as the Superior McCully reduction crusher or the Newhouse crusher, the ratio may be somewhat lower than those for the standard machines because, for a comparable radial receiving opening, these reduction types have larger diameter crushing chambers and, hence, longer openings (as measured parallel to the spider arms. Usually from 2 to 2½ times the primary crusher setting will be satisfactory. These cylindrical-top-shell crushers, when fitted with reversible, full-curve non-choking concaves, have *effective* receiving openings which are considerably less than the radial distance from top-of-head to top-of-concaves. This effective receiving opening must be at least as large as the maximum open-side setting at which the primary crusher will ever be operated (that is, when mantle and concaves or jaw plates are worn thin).

Fine-reduction crushers, such as the Hydrocone, also have effective receiving openings which are smaller than their full rated openings; therefore one must observe the same precaution in selecting sizes of these machines as with the reduction types mentioned in the preceding paragraph.

In selecting crushers of the roll type to follow a preceding stage the maximum permissible nip-dimension must be not less than the maximum discharge setting of such preceding stage; and the length of roll face should be at least 4 to 5 times this setting.

Hammermills should have a minimum throat opening not less than double the setting of a preceding stage of either gyratory or jaw crusher; and the lateral throat opening should be from 4 to 5 times such setting.

Although their characteristics are not particularly favorable for secondary or reduction crushing service, jaw crushers are sometimes so used—for example, in portable and semi-portable plants and in small mining installations. Usually the machines are the single-toggle or cam-actuated types, with receiving openings whose lateral dimension is at least double the dimension from top-to-top of the jaw plates. The lateral opening should be at least twice the discharge setting of the preceding stage, and when non-choking jaw plates are used the effective nip opening must be checked against this discharge setting, just as is done for the gyratory types.

Product Size

Regardless of the number of stages of reduction in the plant, the primary crusher, at least in those plants designed to handle shovel-loaded rock, is usually set at or near the minimum safe discharge setting for which it is designed, although as we have stated, this setting may not be strictly maintained over a long period of time. This practice of utilizing the full permissible reduction-ratio of the primary crusher is quite sound from several standpoints. The primary crusher represents a substantial investment, and the user is justified in his desire to obtain from it all the reduction of which it is capable. Furthermore, the machine is likely to have some excess capacity as compared to the succeeding units in the plant, even at its minimum setting. When such is the case there is nothing to be gained by operating it at a coarser setting. Thirdly, if the primary is a medium or large size machine, its minimum setting will be wide enough to obviate any excessive creation of fines by attrition; in any event the difference in percentage of fines produced at the minimum setting, as compared to any coarser setting, will not seriously affect the percentage of fines in the finished plant product. Unless the material is very hard and tough, or contains a viscid admixture which makes it difficult to get through the crusher, everything is in favor of working the primary at its maximum safe ratio-of-reduction.

The arguments in the preceding paragraph do not always hold good for the secondary stage. Here the discharge settings are much finer, and the ratio-of-reduction begins to have a significant influence upon the percentage of fines that will show up in the plant product. Therefore, where minimum fines are desired, the amount of work done in the secondary stage should be held within conservative limits. The characteristics of non-choking are to be minimized, unless the setting of the secondary stage is to be quite coarse.

For the combination of large jaw crusher followed by a gyratory of the 30- or 36-in. size, there is no particular reason why the maximum reduction-ratio cannot be utilized through both stages, especially if interstage scalping is employed. These secondaries are quite large; in fact such crushers serve as primaries in medium size crushing plants; and their minimum settings are wide enough to permit operating them in the manner suggested without excessive fines production.

Single vs. Multiple Stage

There are no set rules for determining whether the secondary stage should consist of one crusher, or of two or more machines operating in parallel. The decision must be made upon the merits of each problem.

Obviously, if the required receiving opening necessitates the selection of a crusher whose capacity equals or exceeds that of the primary crusher there is no object in going to a two-stage arrangement. Frequently this will be the case where a primary jaw crusher is to be followed by a gyratory machine. On the other hand, if the primary is a large gyratory, and the full output of this crusher is to gauge the output of the plant, it will be necessary to install a battery of two or more gyratories for the secondary reduction. The number and size of

(Continued on page 122)

Winslow Filters now protect Autocar gasoline engines

One of the oldest and most respected names in the truck manufacturing industry is that of The Autocar Company. Autocar's reputation for superlative performance is too precious to be endangered by the use of anything less than the most dependable of accessories as standard equipment on its celebrated gasoline engines. This was especially true in selecting filters, because absolutely clean lubricating oil is imperative in the protection of every engine's moving metal parts. The filters *must* be able to remove sludge, abrasives and moisture, to neutralize acids, and to maintain *full-flow* filtration (keeping *all* the oil clean) at all times. * * * You can understand the pride and pleasure with which the makers of Winslow Filters announce their selection to do this important job. The confidence placed by a pioneer such as Autocar in another pioneer such as Winslow may justify your having equal faith.

WINSLOW FILTERS

Winslow Engineering Company 4069 Hollis Street • Oakland 8, California

Limestone Pays When Properly Used

Agronomist Views on the Need for Agricultural Limestone

By O. T. COLEMAN*

LIMESTONE SUPPLIES CALCIUM and often magnesium—plant foods that are needed by all plants. In addition to this, its proper use on lime-deficient soils, increases the availability of other essential plant foods, makes the soil work easier and promotes the growth of helpful soil organisms.

Like most soil minerals, limestone is relatively immobile especially on the more common silt and clay loam soils, and will remain about where it is applied. For this reason enough should be applied to bring it up to a relatively high level within the zone of the feeder roots of plants. In this respect, it is different from the more soluble nitrates, which percolate through the soil and contact the plant roots, giving the plants a much better opportunity to use a much higher percent of this plant food than of mineral plant foods like calcium and magnesium. Also certain plants require more lime than others and the roots of different plants vary in amount of soil they contact, which influences their ability to feed on these more immobile mineral nutrients. Legumes, being higher in both protein and minerals, require more liming material than do non-legumes. Since they also have a lower percent of root surface in contact with the soil than such crops as rye, sorghums, and grasses, this explains why, for their successful production, the limestone in the soil should be brought up to a proportionately higher level than for most non-legume crops.

The need for liming material is based on the history of liming on the field in question and the exchangeable calcium and acidity, or pH tests on the surface 7 in. of the area in question. For instance, if a silt loam soil has been limed two or three years and the lime worked well into the surface 7 in. of the soil, and the calcium and acidity, or pH, tests do not indicate that more is needed than was applied and worked well into the soil within this two or three-year period, and an exchangeable calcium and acidity, or pH, test indicates a need for four tons, the difference of two tons is recommended.

How Much Agstone Needed?

If exchangeable calcium tests show medium, or between 4000 and 5000 lb., and acidity test is medium, or the pH range is between 5.5 and 5.9, 2 tons of limestone are recommended. When the acidity, or pH test is the same (medium acidity or between pH 5.5 and 5.9) and the exchangeable calcium test is very low, or less than 2800 lb., we would recommend 3 tons of liming material per acre. If the exchangeable calcium was very high and the acidity and pH range was the same as above, the amount of limestone recommended would be reduced to one ton per acre.

When the acidity test shows very slight or the pH range is between 6.5 and 7.0, but the exchangeable calcium is low or very low, as sometimes happens on our low exchange capacity soils, no more lime is needed to change the soil reaction, but some calcium as plant food then becomes advisable. Under such circumstances only small applications of liming material are recommended. These are usually drilled or worked into the soil with seedings of small grain or with grass and legumes. Where heavy applications of rock phosphate are used according to recommendations, however, this need for extra calcium is usually met. Soil testing laboratories that are equipped to measure both the pH and the total hydrogen are in a better position to determine the soil situation, especially in regard to the need for liming material.

When a plant removes basic ions, such as calcium, magnesium, or potassium from the exchange spots on the clay it leaves hydrogen to replace these ions. The exchangeable hydrogen can, therefore, be looked upon as a measure of the amount of spots devoid of bases in the exchange complex of the soil. A soil with a low pH, such as pH 5, has a low saturation with basic ions. On many soils, that have not already been limed, or when the agricultural limestone has not been completely mixed with the soil or where it may not have been on long enough to react with the soil, the tests will show a high reading for exchangeable hydrogen.

The presence of unreacted limestone in the soil may, however, affect the pH reading. This fact furnishes helpful evidence as to whether or not a soil has been previously limed. This and the measure of the total hydrogen will therefore furnish a better measure of the lime needs and the percentage saturation of the soil with basic ions.

Our tests for exchangeable magnesium are used in two ways—to determine whether more of this mineral is needed directly as a plant food and whether it should be used because of a wide calcium-magnesium ratio. For example, if the test for exchangeable magnesium is high or very high, over 600 lb. per acre, except on our relatively high exchange capacity soils, it is not likely that more will be needed as a plant food. If the test is low or very low, less than 200 lb. per acre, it is fair evidence that more of this plant food would be advisable to

(Continued on page 106)

*Extension Specialist in Soils, University of Missouri

PERCENTAGE OF GROUND LIMESTONE PASSING THE VARIOUS SIEVES AND THE EXTRA NEEDED FOR BEST RESULTS

Average Percent Passing					Extra Limestone Needed For Best Results
8-Mesh	10-Mesh	12-Mesh	40-Mesh	100-Mesh	
100%	98%	96%	70%	46%	None
98	93	90	52	28	0-5 %
93	86	83	45	26	10-15
88	79	77	42	23	20-25
83	73	70	37	21	30-35
76	65	63	32	19	50-60

Soil tests are essential in planning a program of soil improvement and maintenance. Ratings of the different levels of the most important plant foods according to soil tests are given below.

SOIL FERTILITY RATINGS BASED ON SOIL TESTS FOR PLANT FOODS

Soil Test Rating	Percent Stable Orangic Matter			Pounds Plant Food Per Acre*			
	Sand and Sandy Loams	Silts and Silt Loams	Clay and Clay Loams	Soluble Phosphate	Exchangeable:* Potassium	Calcium	Magnesium
Very low	0.5	1.0	1.5	Up to 30	Up to 75	Up to 2240	Up to 100
Low	0.6-1.0	1.1-2.0	1.6-2.5	31-80	76-150	2241-4000	101-200
Medium	1.1-1.5	2.1-3.0	2.6-3.5	81-140	151-220	4001-5000	201-400
High	1.6-2.0	3.1-4.5	3.6-3.5	141-191	221-280	5001-6720	401-800
Very high	2.1	4.6	5.1-5.0	192	281	6721	801

*Above is for silt loam. For clay loam, the figures should be raised about one-half.

LIME REQUIREMENT IN POUNDS PER ACRE FOR SWEET CLOVER OR ALFALFA FOR VARIOUS DEGREES OF SOIL ACIDITY AND EXCHANGEABLE CALCIUM

pH Range	4.5-4.9	5.0-5.4	5.5-5.9	6.0-6.4	6.5-6.9	7.0
Soil Acidity	Very Strong	Strong	Medium	Slight	Very Slight	Neutral
Exch. Calcium						
Very Low	10000	8000	6000	4000	1500	500
Low	9000	7000	5000	3000	1000	500
Medium	8000	6000	4000	2000	500	500
High	7000	5000	3000	1000	None	None
Very High	6000	4000	2000	500	None	None

The toughest three-letter word in business

"But . . ."

The word a man uses when he starts by nodding yes and ends by saying no.

"But . . ."

The word on a Multiwall buyer's tongue just after he's said, "Well, as long as we order by specification, I guess one brand's as good as another . . ."

Executives who purchase more than 85 per cent of all Multiwalls have a big BUT there.

They testify* that there are many other considerations. Among the most important, the reputation of the manufacturer. They judge him by his record of reliability, his effort to meet delivery dates, his willingness to give a full measure of service.

We welcome the challenge of the toughest three-letter word in business. We believe the attention big buyers of Multiwalls pay to the *extra* factors—dependability, for instance—has a lot to do with their giving Union a greater proportion of their Multiwall business.

More so every day . . .

IT'S UNION FOR MULTIWALLS

TRADE MARK UNION

**August, 1951 research study.*

UNION BAG & PAPER CORPORATION • NEW YORK: WOOLWORTH BUILDING • CHICAGO: DAILY NEWS BUILDING

Dig Everything from Mud to Rock

with

STOCKTON "YUBABILT" CLAMSHELL BUCKETS

Stockton "Yubabilt" Power-Arm type clamshell bucket, 6 cu. yds., 22,000 lbs., welded steel plate construction, round nose without teeth, custom-built for Hawaiian Dredging Co.

2 TYPES—California and Power-Arm
CAPACITIES—½ to 6 cu. yd.
3 WEIGHT CLASSES—Heavy; Standard; Special Light Weight
WEIGHT RANGE—2125 lbs. to 45,000 lbs.

California Type designed expressly for channel and reclamation dredging, has few working parts, well balanced for digging peat soil, river bottom adobe and mud; discharges quickly and cleanly. First built in 1872, produced continuously ever since.

Power-Arm Type built for tough, continuous digging of rock, hardpan, coral and other hard, abrasive materials. Correctly balanced weight and powerful closing action provide exceptional digging ability. Especially suited to close-up work near wharves and on caisson jobs.

Both the California and Power-Arm types are built in all three weight classes:

HEAVY for extra penetration in tough digging.

STANDARD for most dredging jobs.

SPECIAL LIGHT WEIGHT for soft, slushy materials.

Consult us about clamshell buckets. Estimates gladly furnished. Wire, write or call NOW

YUBA specializes in the manufacture of
Bucket Ladder Dredges
Parts
Screens
Conveyors
Hoist Equipment

YUBA MANUFACTURING CO.
Room 717, 351 California St., San Francisco 4, Calif.
or
STOCKTON IRON WORKS
P. O. Box 1331 Stockton, California

50

Limestone Pays

(Continued from page 104)

meet the requirements for a high-yielding crop.

Now where the tests show between 200 and 600 lb. of exchangeable magnesium per acre, the ratio between this and the exchangeable calcium is used to determine whether there might be a deficiency of this nutrient. If this ratio is as wide as 15 lb. of calcium to 1 lb. of magnesium and the soil tests for exchangeable calcium and acidity, or pH, indicate that more limestone is needed, the best method of meeting the needs for it would be through the use of dolomitic or magnesium limestone. By using this method, the magnesium level in the soil would be brought up and the requirements for this mineral should be met for several years through the reserve supply added.

However, on those soils that have been adequately, or over-limed, with calcium limestone to the point where the tests showed additional limestone might raise the pH too high—or if more calcium limestone was used it might cause the calcium-magnesium ratio to become too wide, and magnesium in some other form would be advisable.

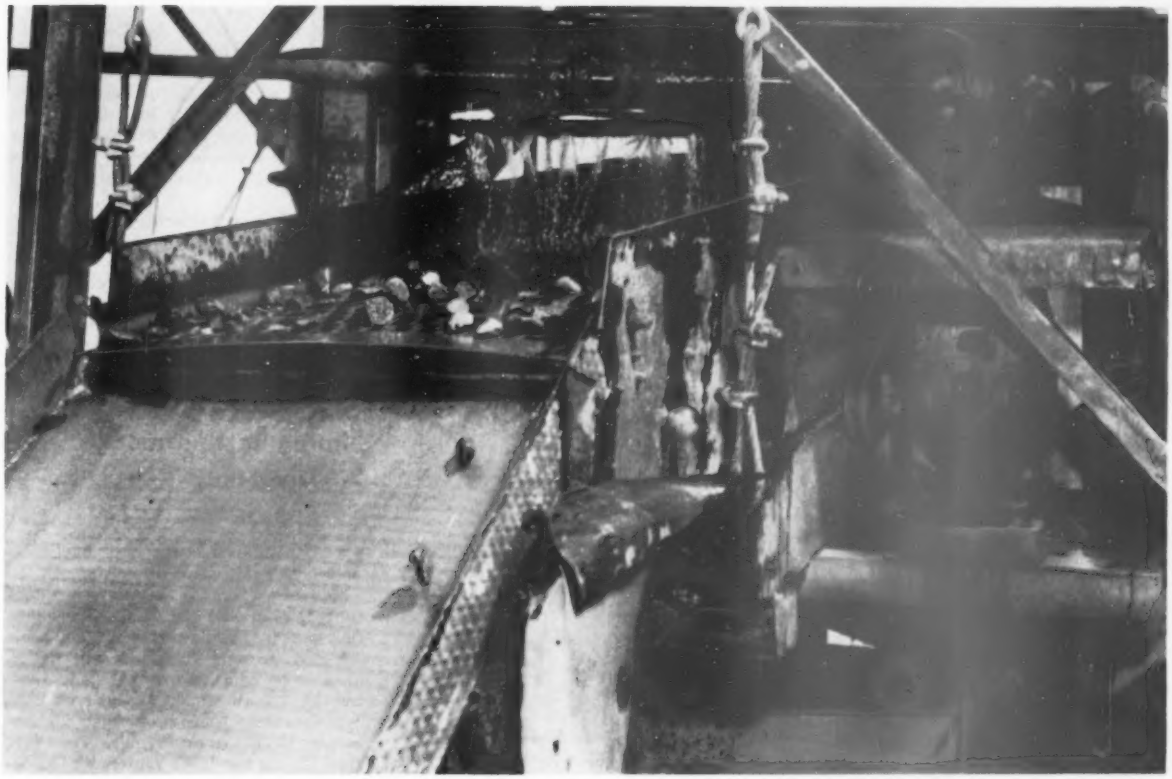
Such applications would then be on the annual or short-time basis rather than a basis to bring up the level or reserve supply as is done with magnesium limestone. In such cases, should the soil indicate a need for potassium as well as for magnesium, sulphate of potash magnesia could be used to advantage. This contains about 22 percent K_2O and 18 percent MgO. In those cases where neither limestone nor potassium was needed, magnesium sulphate, trace minerals containing magnesium, or fertilizers—usually used as starter or maintenance applications—containing trace minerals, including magnesium, could be used. Since most soils contain more magnesium in the subsoil than in the surface, it would usually be advantageous, if more magnesium is needed, to plow deeper in order to bring up some of this magnesium. For those soils that have acid-clay subsoils this might also be an advantage, when they have been overlimed, by reducing the pH as well as helping narrow the calcium-magnesium ratio. On low-organic-matter soils the addition of barnyard or green manure, or organic matter in some other form, should be helpful in buffering the imbalance of the calcium-magnesium ratio.

In conclusion I would like to emphasize the fact that sufficient liming material in the soil is essential for the satisfactory production of nearly all crops. A higher level is needed to grow legumes than non-legumes. Legumes should usually be grown often enough to provide the needed turnover of decaying organic matter in the soil for high yields of quality feed. The amount of liming material to apply can be determined by means of

(Continued on page 108)

Smooth Screening with SECO

at Seybold Bros., Inc., Division of B. R. DeWitt, Inc., Dunkirk, New York



Accurately Producing No. 3 Stone, N.Y.S. No. 1 and No. 2 Gravel, plus Concrete Sand on 3 x 9 Double Deck Seco Screen

Take it from Frank Yonkers, Superintendent of sand and gravel operation, this Seco vibrating screen is a smooth performer! Thanks to Seco's patented construction, its exclusive fully controlled true circular action pays off in accurate screening results. But that's not all. It pays off by being dependable. It stays on the job working without annoying shutdowns for excessive maintenance. Getting the job done right means greater profits for progressive operators. That's why more and more operators are assigning their toughest screening jobs to Seco vibrating screens. Get the whole convincing Seco story. Send for Catalog #203 today!

SECO

TRUE CIRCULAR ACTION

VIBRATING SCREENS

SECO MODELS FOR SCREENING EVERYTHING FROM DRY SAND TO RIP-RAP

Single, double, triple and three and one half deck models. Get expert Seco Advice. Write

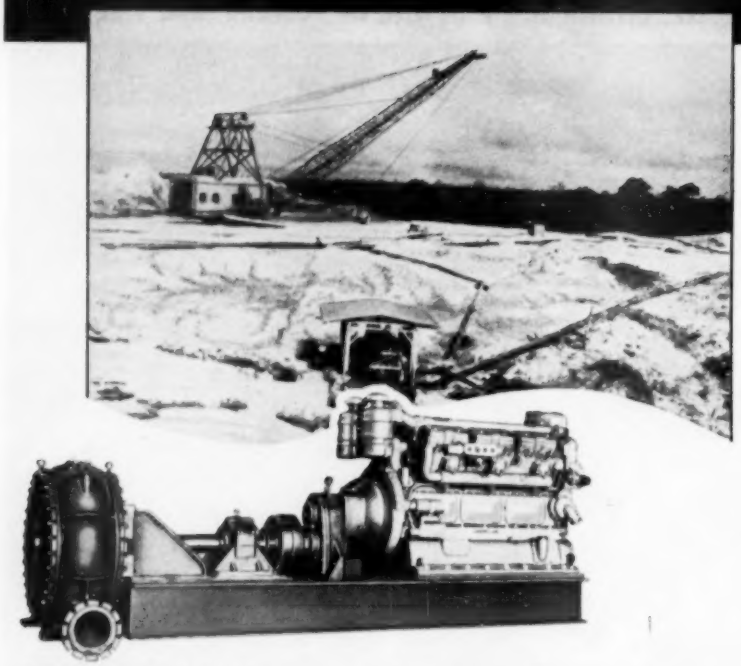
SCREEN EQUIPMENT CO., INC.

1750 WALDEN AVE.

Buffalo 25, New York

In Canada: United Steel Corp., Toronto, Ontario

Here's the most efficient dredge pump ever built . . . mining bauxite in British Guiana



MORRIS Type G Dredge Pump

"Delivers more material—in a shorter time—at lower cost." This is the one comment we consistently receive from all over the world on the Morris Type G Dredge Pump.

What makes the Type G so efficient is its design and construction—the end result of 89 years' experience in specialized pump manufacture. The patented impeller design balances casing pressure—eliminates points of unusual wear. All parts wear evenly, last far longer. Critical sections of the casing are considerably thickened to greatly increase casing life. Specially designed bearings stand up under the severest kinds of hydraulic or mechanical loads.

Because of its special bearings, the Type G can run at considerably higher speeds than normally expected of dredge pumps—and can be direct-connected to high speed Diesel engines. For example, at the Demerera Bauxite Company of British Guiana the Morris Type G shown above is driven by a Caterpillar D-386 engine through a Cotta 2 : 1 reduction gear.

Speed—output—economy . . . you get all 3 with a Morris Type G. Let our engineers help you select the right pump size for your particular needs. No charge or obligation.

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Branch Offices in Principal Cities

MORRIS Centrifugal Pumps

the acidity or pH and the exchangeable calcium tests.

Materials testing 95 percent or more in calcium carbonate equivalent and ground finely enough to pass a 10-mesh sieve, are usually best to use. When less pure or coarser than this, proportionately larger amounts should be applied (see table).

For best results, limestone should be spread evenly over the surface and worked well into the soil or plowed under so as to be in the feeding zone of the plant roots. It may be applied any time of the year when spreading machinery can be driven over the fields without injuring the growing crops.

Two major considerations which are important in the use of agricultural limestone are:

1. It should be applied according to soil test recommendations.
2. It cannot substitute for other nutrients. Most soils need other plant foods in order for limestone to be effective.

Liming Pays Farmer Big Dividends

By G. W. VOLK*

WHY MORE LIMING MATERIAL has not been used by farmers to bring their lands to maximum productivity is indeed mysterious. The mere fact that liming material of good quality and properly applied will net a greater percentage profit for each dollar spent than almost any other farming operation does not seem to impress the average farmer. The fact that liming the land is a basic, fundamental requirement for good soil conservation should be reason enough to stimulate those tilling the soil to greater usage. The question then comes to mind, "Does the average farmer actually know the real value of following a good liming program on his farm?"

It appears that there may be many reasons why the use of liming materials has not increased as has fertilizer usage. Any one of these reasons may appear insignificant; however, their combined effect is to encourage a complacent attitude toward this material.

Crops have been grown on acid soils for hundreds of years, thus leading the unsuspecting into a sense of false security with regard to soil acidity. Unlike fertilizers, crop responses to agricultural limestone are slower to appear and last over a longer period of time. Many farmers are looking for immediate returns from money invested and do not realize that the profits from agricultural limestone are great. Little does he realize that even still greater production can be obtained when a good liming and fertilizer program are used together on the same land. A better extension and

*Chairman, Department of Agronomy, Ohio State University

AMSCO V-MANG

The new moly-manganese electrode that's better than nickel-manganese rods for build-up and repair

- TOUGHER DEPOSIT
- BETTER WELDABILITY
- HIGHER YIELD STRENGTH
- LESS CRACKING

Comparison of yield and tensile strength

For full engineering and metallurgical information on Amsco V-Mang, write for technical data sheet to Amsco, Chicago Heights, Illinois.

AMSCOATING
THE RIGHT WAY TO SAY HARDFACING

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
377 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que.
Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

CF&I STEEL PRODUCTS FOR THE SAND AND GRAVEL INDUSTRY

If you want to keep abreast of MODERN PRACTICES by producing Manufactured Sand use CF&I GRINDING RODS

CF&I Grinding Rods are rolled from special analysis steel — machine straightened with square cut ends. They minimize tramp oversize . . . resist abrasion and wear evenly to provide efficient, economical grinding.

CF&I Products for the Sand and Gravel Industry

Cal-Wic Wire Cloth Screens • Wickwire Rope
Grinding Balls • Grinding Rods • Light Rails and Accessories

THE CALIFORNIA WIRE CLOTH CORPORATION, OAKLAND
THE COLORADO FUEL AND IRON CORPORATION, DENVER and NEW YORK

CF&I GRINDING RODS
THE COLORADO FUEL AND IRON CORPORATION

1040

sales job must be done to carry these facts to the farmer in an easily understandable form. The general idea that agricultural limestone is used to neutralize soil acidity and not thought of as a fertilizer for crops should be corrected. It is as much a fertilizer as manure or other fertilizer materials and in many cases far more important because it not only furnishes certain plant nutrients, but affects the availability of soil plant nutrients, soil biological activity and plant species.

Liming materials are not as attractive as concentrated fertilizers because they appear to be a bulky, cheap material. Then confront the farmer with a 4- or 5-ton application per acre at somewhere between $3.50 and $8.50 per ton, and he decides he cannot afford to or definitely does not have the money to apply agricultural limestone to his 10-acre field. He is torn between the fact that he must either buy his own spreader or have heavy trucks travel over his land, severely packing his soil. Little does he realize that soil without excess water is only slightly damaged by truck wheels and at that only temporarily. Add to these things his reliance on government payments for agricultural limestone application, and it is easy to see why the farmer who does not qualify for such payments neglects his liming program.

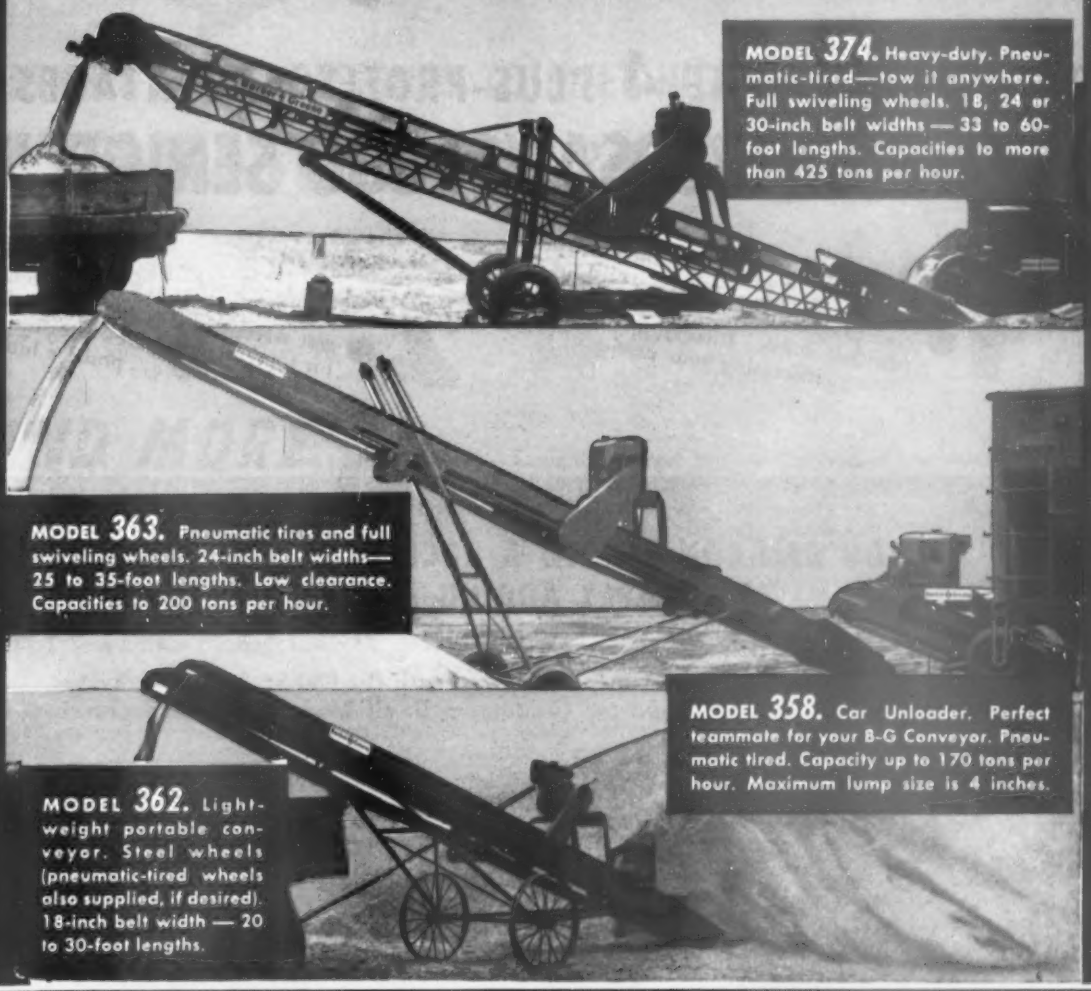
In order to increase the use of limestone as a soil amendment for crop production and soil conservation, it is absolutely necessary to carry on an extensive program of education concerning the value of this material. This can be done by the preparation of leaflets containing authentic information, and by organizing farmer group meetings. The limestone manufacturers can cooperate with veteran instructors, vocational agriculture teachers, county agents, and Extension specialists. There are volumes and volumes of good research data that could be used in an educational program.

The use of demonstrations is an excellent way to show what agricultural limestone will do in increasing crop yields. Spreading demonstrations are good; however, the farmer is far more easily convinced that liming pays if he can actually visit and see the better crops on limed land as compared to unlimed land. Establish a series of demonstrations in conjunction with the county agent. Have the agent include them in his summer farmer tours. Show the farmer by actual test that the unlimed land is acid and the other is more nearly neutral. Impress upon him that he can have his soil tested and receive liming recommendations. Be sure that he knows that agricultural limestone can be applied at almost any point in a rotation. The only time it cannot be applied is when the soil is too wet or when crops will be severely damaged by the mechanical operation of spreading.

PORTABLE CONVEYORS YOU NEED

Here are three standard B-G Portable Conveyors together with B-G Car Unloader . . . all available for prompt delivery from your B-G distributor. These skillfully designed and ruggedly built machines will—within the limits of their capacities—provide you with the most efficient and economical method of handling sand, stone, gravel, coal, coke, ashes, wet concrete, chemicals, bags and boxes.

In addition to the models shown, Barber-Greene also builds larger capacity portable conveyors. Why not check with your B-G distributor for complete information on portable conveyors?



MODEL 374. Heavy-duty. Pneumatic-tired—tow it anywhere. Full swiveling wheels. 18, 24 or 30-inch belt widths — 33 to 60-foot lengths. Capacities to more than 425 tons per hour.

MODEL 363. Pneumatic tires and full swiveling wheels. 24-inch belt widths—25 to 35-foot lengths. Low clearance. Capacities to 200 tons per hour.

MODEL 358. Car Unloader. Perfect teammate for your B-G Conveyor. Pneumatic tired. Capacity up to 170 tons per hour. Maximum lump size is 4 inches.

MODEL 362. Lightweight portable conveyor. Steel wheels (pneumatic-tired wheels also supplied, if desired). 18-inch belt width — 20 to 30-foot lengths.

Barber-Greene

Aurora, Illinois, U. S. A.

Get all 4 and MORE

FOR THE FIRST TIME 4 PLUS-PROFIT ADVANTAGES IN *COMPARE* UNIVERSAL'S 880 SENIOR "R"

NOW!

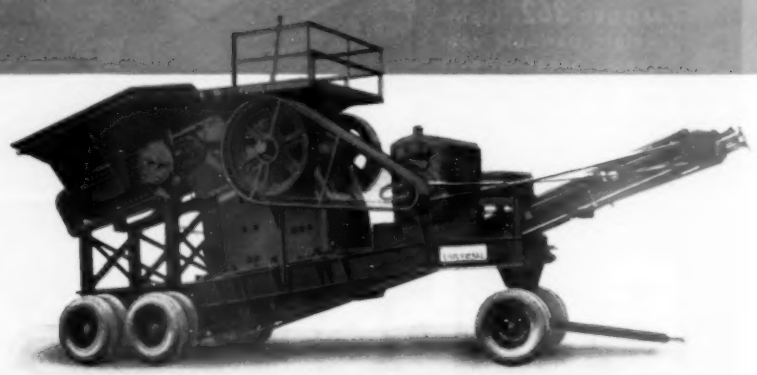
1 ● 3024 ROLL CRUSHER. Increased from 3022 in size . . . Biggest rolls in this class plant. Roll feed designed to utilize full 24" width. Increasing production, increasing your profits.

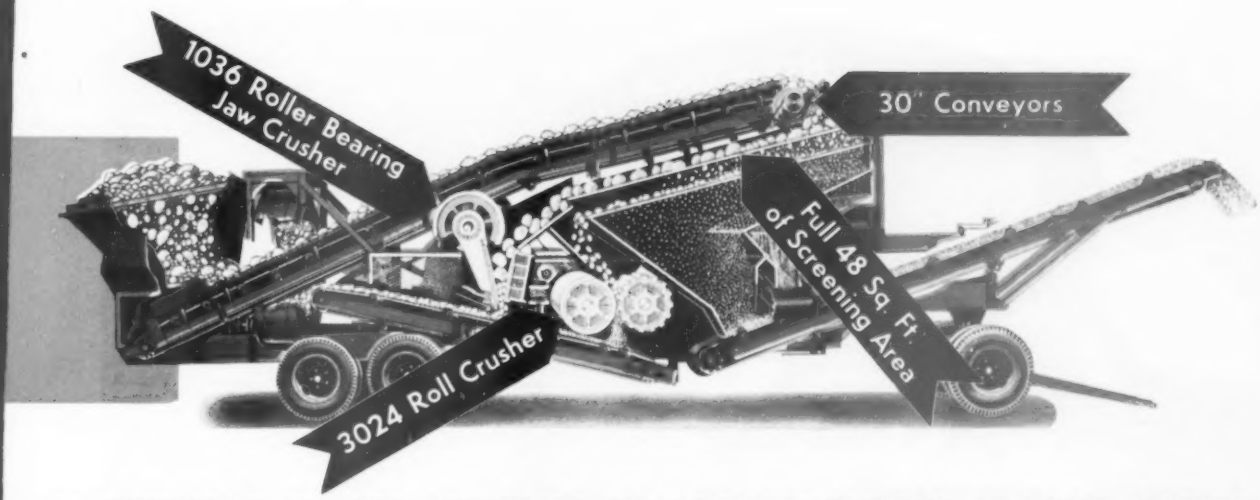
2 ● FULL 48 SQ. FT. OF SCREENING AREA — 4' x 12' 2½ Deck screen — Biggest screens in this class plant. Inclined for top efficiency. New pressure oil lubricated bearings . . . positive lubrication.

YOU CAN CONVERT TO A ROCK PLANT AT MINIMUM COST BY SIMPLY ADDING A UNIVERSAL 546P

This primary breaker teamed with the 880 Senior "R" provides flexibility and top production in all kinds of rock and gravel.

ENGINEERED FOR TOP OPERATING PROFITS





A PORTABLE PLANT DESIGNED TO MEET HIGHWAY WEIGHT LIMITS

GRAVELMASTER *WITH THE FIELD*

3 ● UNIVERSAL'S overhead eccentric action, famous in the industry for 47 years, with two distinct crushing blows, force feed and fast discharge results in top capacity and top profits.

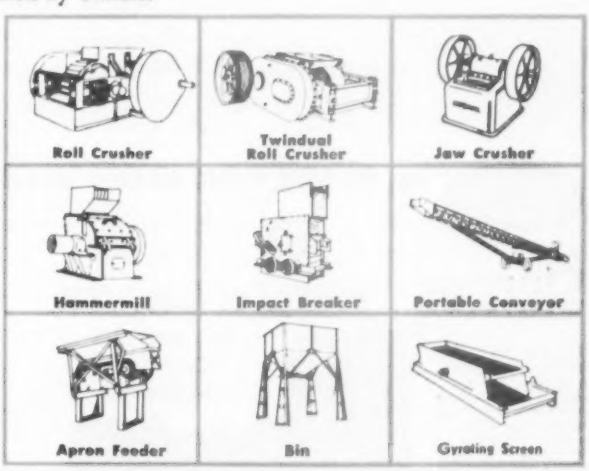
4 ● 30" CONVEYORS deliver the profit-making production of the Senior "R". Channel Frame construction throughout. Troughing rolls feature Universal's field-proven bearings. Permanently lubricated.

. . AND MORE . . . **Portability** — Designed to meet State weight limits. Less moving time, more profits. **Dependability** — Due to Universal's know-how. **Capacity** — Big jaws, rolls, screen and conveyors are balanced to produce maximum tonnage under the most severe operating conditions. This combination makes the 880 Senior "R" Gravelmaster a top producer in the field, acclaimed by owners.

FOR TOP PROFITS BUILD WITH UNIVERSAL SOUNDLY ENGINEERED BASIC UNITS

Whatever your particular crushing, screening, washing, or loading problems might be, Universal equipment invites comparison. For information on the complete Universal line at your next opportunity see your nearest Universal distributor or write Universal Engineering Corporation, 617 C Avenue N.W., Cedar Rapids, Iowa, a subsidiary of Pettibone Mulliken Corporation, 4700 W. Division Street, Chicago 51, Illinois.

When you Move, Move Quickly and Easily with Universal Portable Plants . . . And You Move On To Greater Profits



UNIVERSAL GAVE CEDAR RAPIDS ITS ORIGINAL FAME FOR QUALITY CRUSHERS **IN CEDAR RAPIDS SINCE 1906**

PMCP **UNIVERSAL**

ENGINEERED FOR TOP OPERATING PROFITS

HIGH SPEED PRODUCTION is routine with a Nelson! Sand, gravel, broken stone (up to 3" cube), lime, gypsum, etc., can be loaded at up to 4 cu. yds. per min. Users report day after day production of over 1,000 tons per 8 hour day . . . Hydraulic boom control is instantly responsive and is automatically held at any desired position. Boom can be lowered without disconnecting drive chains. Rotary Screen attachment available.

STEEL TOOTHED SPIRALS "pick before they shovel" to loosen material for faster loading . . . Mounted on 6 rubber tires, the P-11 is highly mobile and easily operated by one man . . . You can depend on a NELSON for high-speed loading at the lowest possible cost!

Write for catalog No. 531 showing a wide variety of working photographs, mechanical details and complete specifications.

NELSON

N. P. NELSON IRON WORKS, INC.
CLIFTON • NEW JERSEY
MANUFACTURERS OF LOADERS SINCE 1917

Slurries...*handled at lower cost*

The new WILFLEY MODEL K Centrifugal Sand Pump embodies important mechanical improvements especially adapted to the handling of cement slurry and results in stepped-up production and substantial power savings. Individual engineering. Write for details.

Buy WILFLEY for Cost-Saving Performance

A. R. WILFLEY & SONS, Inc.
Denver, Colo., U.S.A.
New York Office: 1775 Broadway, N.Y.C.

WILFLEY centrifugal PUMPS

KEEP ABREAST WITH INDUSTRY TRENDS THROUGH ROCK PRODUCTS

Indiana Aggregates

(Continued from page 94)

such familiar categories as limestone, dolomite, sandstone, siltstone, shale, and chert. The metamorphic rocks, finally, were subdivided into four or five categories, the most common of which are quartzite, gneiss, and schist.

After these laborious identifications have been made, the data may be marshalled in a variety of ways. The total amount of each general class, such as igneous rocks, may be shown within each sieve size. The figures could also be used to calculate the total amount of igneous rock in the gravel fraction of the sample. Fig. 2 shows the relative amounts of those constituents in which engineers and aggregate producers are most interested. The figures are for the total of all fractions above 4 mesh; in other words, all of the materials which would normally go into gravel.

In deciding which types of rock have the greatest effect on whether aggregates are satisfactory or unsatisfactory, we went to the manual of standard specifications used in Indiana for road and bridge construction and maintenance. The specification for coarse aggregate lists under "Deleterious Materials" the items clay lumps, ocher, shale, shells, soft or non-durable particles, and chert. A footnote explains the phrase "soft or non-durable particles" to mean "particles which are structurally weak, such as soft sandstone, iron-clay balls, coal, weathered schist, or cemented gravel." Our analyses do not fit this classification to perfection, as some sandstones are not soft and some schists are not weathered, whereas some other types of rock not mentioned here are soft or weathered, or both.

Fig. 2 shows those materials classed as deleterious which are in sufficient abundance to permit them to be shown graphically on this scale. Siltstones and sandstone have been placed in the same column because most siltstones are probably classed as sandstones under the terms of these specifications. Each graph was drawn with 20 percent as the upper limit for each constituent, and any constituents which exceeded 20 percent are shown with an irregular, broken line at the top of the column. The number beneath each bar graph is the total percentage of the entire gravel sample which falls in the four categories: chert, siltstone, sandstone, and shale. These total amounts of deleterious materials range in the samples shown on this map from 3 percent to 85 percent of the total gravel sample.

The few samples shown from the Ohio Valley show progressively higher chert content and total deleterious content in a downstream direction. If pit samples could be obtained in the area between Louisville and the south-western corner of the state, this progressive increase would probably

ON THOSE HEAVY DUTY BELT CONVEYORS . . . USE

Jones

HIGH TENSILE ALLOY IRON

CONVEYOR PULLEYS

- Tailor-made to meet your requirements in standardized designs for belt tensions up to 1500 pounds per inch of face.
- Mounted on shafts with Jones-Timken pillow blocks and couplings factory assembled to simplify field erection.
- Drive Pulleys with plain or grooved lagging.

End view of Jones 60" x 24" Pulley showing heavily ribbed arms and split-clamp hub.

Jones 60" x 57" Rubber Covered Pulley mounted on 9" Jones-Timken Pillow Blocks

- JONES is the prime source of supply for complete drives to HEAVY INDUSTRY.
- *Ask for Catalog No. 83*
- Herringbone — Worm — Worm-Helical — Spur Gear Speed Reducers • Cast Iron Pulleys • V-Belt Sheaves Timken Pillow Blocks • Flexible Couplings • Cut Gears

W. A. Jones Foundry & Machine Co.

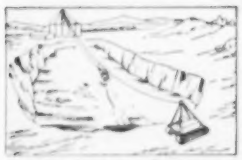
4447 West Roosevelt Road, Chicago 24, Illinois

Since 1890 . . . In the Service of Industry

ONE MAN----- ONE MACHINE

Picture shows how a Sauerman Slackline Cableway digs gravel deep under water and hauls the material to top of screening plant. Swinging in a wide arc, the machine moves a huge yardage at one setup of the mast.

SAUERMAN EARTHMOVERS



Sauerman Slackline Cableway Works in Wet Pit.

Versatile
Efficient
Economical

Sauerman Scraper Excavator Digs Gravel from Hill.

Whether your operation is large or small . . . regardless of the type of material you are handling . . . there is a size and type of Sauerman Machine best suited to your particular application.

Low in initial cost, Sauerman Scrapers and Cableways are noted for long, dependable service, even under the most gruelling conditions. Labor requirements are minimum—only one man is needed to operate these machines. Maintenance and power consumption are extremely low.

Whether your handling problem is excavating or stockpiling bulk materials, it will pay you many times over to consult Sauerman. Benefitted by more than forty years experience, our Engineering Department will advise and assist you in setting up an efficient long-lasting and profitable operation.

Whatever your earthmoving problem may be, Sauerman has a size and type of machine to do the job. Write today for illustrated catalogs. Sauerman Bros., Inc., 530 S. Clinton Street, Chicago 7, Illinois.

Long Range Material Handling Machines

Pulverizers

Have you investigated our new BRADLEY HERCULES MILL? Unquestionably the last word in Economy and Simplicity.

(Send for New Catalog No. 59)

BRADLEY PULVERIZER CO.
ALLENTOWN, PENNA.

continue and the total deleterious content would be extremely high in the Evansville area. The increase in deleterious materials in the west fork of White River is readily apparent between the vicinity of Noblesville and the confluence of the two forks of the White River. In the Wabash sluiceway, the progressive increase in chert is apparent from northeastern Indiana to the juncture with the Ohio River. The upper reaches of the Wabash contain relatively small amounts of sandstone, siltstone, and shale, whereas the samples downstream from Lafayette show noticeably higher amounts of these materials. The gravels of extreme northwestern Indiana show extremely high amounts of shale, sandstone, and siltstone, although their chert content is not excessive. A broad area in northcentral to northeastern Indiana has variable but not excessively high chert content and shows unusually large amounts of sandstone. In each sluiceway, a few exceptions to the progression have been found.

Direct relationships exist between the amounts of these constituents and the bedrock in the area over which the ice passed just before releasing its burden.

Again, the materials from which producers must meet a single set of specifications are extremely diverse in composition. Recognition of this diversity is shown by the special clause in the Indiana specifications which provides that the limits of the amount of chert may be waived for those sources of aggregates that lie in counties south of U.S. Highway 50 or through which this highway passes, provided that gravels from such sources have a satisfactory service record under similar conditions of service and exposure. Highway engineers think in terms of highways and undoubtedly feel that a numbered highway makes an ideal boundary for any purpose, but the realistic boundary for any such deviation from specifications is a geologic one. Some of the lowest chert contents in the state may be found in areas south of U.S. 50. Nevertheless, this special clause was a realistic move to use aggregates in regions where none would have passed the usual specifications. However, the terms of the clause do not accurately delimit the area of shortage. Additional special clauses may become necessary in Indiana and other states if the increasing demand for aggregates is to be met.

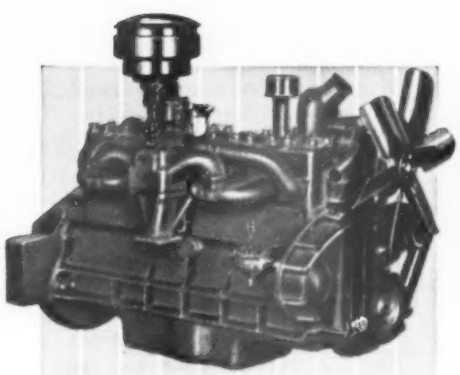
Chief Project Engineers

WILLIAM BELLANO has been appointed chief project engineer in charge of mining for International Minerals and Chemical Corp., Chicago, Ill. James L. Taylor has been named chief project engineer in charge of construction, and Robert F. Marek, chief project engineer in charge of industrial engineering.

EASIEST WAY OUT OF A RUT

Photo Courtesy Gar Wood Industries, Inc., Findlay Division, Findlay, Ohio

Pedigreed Horsepower digs ditch, carries dirt away, moves ditcher!



Without ever moving from his seat, this operator can dig a ditch eight feet deep and up to twenty-four inches wide. With an individually controlled clutch and brake for each crawler, he can dig straight as an arrow or curved as nicely as you please. With positive-pressure hydraulic controls holding the boom at the desired depth, he can easily undercut pipes or other obstructions, dig right up to foundations. Forward or reverse, the operator can select from a large number of digging speeds . . . going forward, he can dig up to nineteen feet per minute.

The plain fact is, this operator has it pretty good . . . the simplified controls of his Buckeye General Utility Ditcher and the Model 8 Chrysler Industrial Engine powering excavator, dirt conveyor and traction members were practically *made for each other*. For this manufacturer, like others, selects his Chrysler Engines equipped to meet his needs. Standard or gýrol Fluid Coupling, Torque Converter, standard or special dust-resistant air cleaner, gasoline, propane or natural-gas burning carburetors, fungus-treated or corrosion-resistant electrical systems, all of these were among the optional equipment available for his selection.

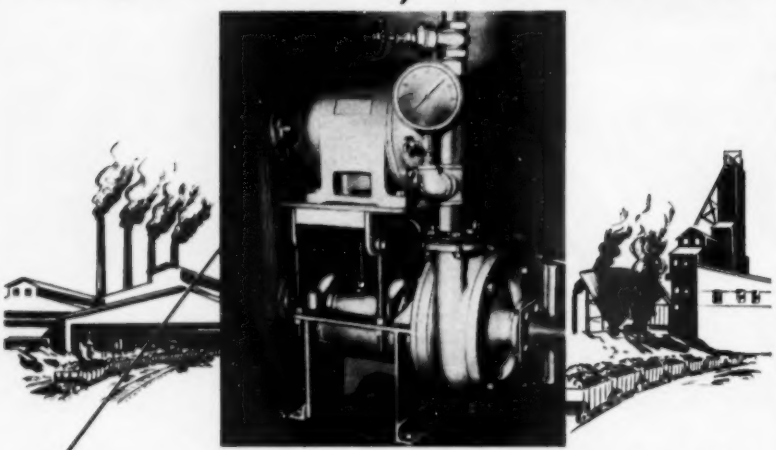
Chrysler Industrial Power is not expensive. Production-line methods adapted to specialized industrial engine building provide a custom-built engine at mass production prices.

See a Chrysler Industrial Engine Dealer for your needs, or write us direct: ***Department 135, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.***

CHRYSLER
Industrial Engines

HORSEPOWER **WITH A PEDIGREE**

VACSEAL PUMPS



Come thru with flying colors!

The score card on this pump at the end of three years of hard service reads: ONLY ONE PART REPLACED AND MINIMUM SERVICING REQUIRED. The report is typical of many Vacseal records kept from 1950 to 1953. Altogether, they make a big success story — pointing up the supremacy of the Vacseal feature which eliminates impeller adjustments and requires NO SEALING WATER to protect glands and clearance spaces.

Vacseal Pumps — for handling abrasive, acid or corrosive materials—are fully described in a catalog free on your request.

Leaders in Experience & Service

THE GALIGHER CO.

METALLURGICAL DIVISION — ENGINEERING SERVICE

CONSULTATION • ORE TESTING
PLANT DESIGN • GEOLOGIC INVESTIGATION

HOME OFFICE: 545 West 8th South, Salt Lake City, Utah, P. O. Box 209
EASTERN OFFICE: 921 Bergen Avenue, Jersey City, New Jersey
Agents In All Principal Foreign Mining Districts

COMPLETE CRUSHING PLANTS
designed and equipped by FARREL-BACON

Farrel-Bacon provides a complete engineering service, including design of plant and supplying all equipment from primary crusher to bin gate. Jaw-type crushers are available in sizes from 60" x 48" to 10" x 7" *Write for complete information.*

FARREL-BACON
ANSONIA, CONNECTICUT

BA-5

Labor Relations Trends

(Continued from page 49)

guaranteed compensation is actually predicated upon and computed by the stipulated wage rate meet all requirements of the Act. This was true before as it is after the amendment of the Act in 1949 to recognize the validity of such contracts. The payroll records though technically inaccurate because failing to show the number of hours actually worked do not control the terms of the contracts of employment established by the evidence.

"The District Court did not abuse its discretion in vacating the injunction of 1942. At the time it was vacated the injunction had been in force for approximately ten years. The investigator of the Department of Labor testified that at the time of his examination in June 1951 he discussed the supposed inadequacies of the packing company's payroll records with the management and that every suggestion he made was immediately complied with. The trial court in pointing out in its findings of fact the inaccuracies discovered in the payroll records of six of approximately one hundred employes concluded his findings as follows: 'Said records are now being properly kept and maintained.' With the exception of the errors in the payroll records, pertaining as noted to only six employes, no violations of the injunction were found or even alleged after a most searching investigation of the packing company's wage and employment practices covering the period of nearly ten years.

"The court also found that the errors in the payroll records were the result of an honest but mistaken belief on the part of the management of the packing company that the records as kept were in full compliance with the Act and the terms of the injunction of 1942, and that they had been corrected and would not occur in the future. These findings, without dispute in the evidence, amply sustain the court in its opinion that the injunction of 1942 should be vacated.

"The judgment of the District Court is affirmed."

With a new Secretary of Labor, and it is to be hoped a more fair-minded one, there is little likelihood that this case will be pursued any further. However, it provides a good example of how the F.L.S.A. administrator and the U.S. Labor Department wasted our taxpayers' money on trivial and unfair cases against well-meaning and honest employers (and taxpayers).

Two-Year Statute of Limitations

The U.S. Supreme Court also rendered an important decision on March 9, 1953 which has received little or no publicity. It concerned the alleged right of the Public Contracts Act administrator to collect liquidated damages for alleged violation of the Act

(Continued on page 120)

"Eucs"

Deliver More Payloads at Less Cost

EUCLIDS have what it takes to deliver more loads per hour at the lowest cost per ton or yard moved ... large capacity, plenty of power and speed, and long service life on the toughest jobs.

"Eucs" are unmatched for job availability — they've established records for high production on a wide range of construction, open pit mining, quarry operations and industrial jobs. This dependable performance is backed by Euclid distributors and factory branches with facilities to provide genuine parts and prompt service to owners everywhere.

Less down time and maintenance costs assure more profitable hauling. Have your Euclid Distributor show you how "Eucs" can deliver more payloads on your off-the-highway work.

Bottom-Dump Euclids—13 to 25 cu. yds. ... 190 to 300 h.p. ... top speeds loaded to 34.4 m.p.h.

Rear-Dump "Eucs"—10 to 34 tons ... 125 to 400 h.p. ... spring mounted or semi-rigid drive axles ... top speeds loaded to 36.3 m.p.h.

The EUCLID ROAD MACHINERY Co., CLEVELAND 17, OHIO

EUCLIDS

Try AFCO balls. See for yourself how they grind longer and more efficiently, how they reduce grinding ball consumption. Write, wire or phone NOW for prices.

"AFCO"
AMERICAN
FORGE CO.

Executive offices and plant: Niles, Calif.
Phone Niles 3311
Sales offices:
101 Park Ave., New York City
Portland, Oregon
Los Angeles, Calif.
Salt Lake City, Utah
6

Labor Relations Trends

(Continued from page 118)

beyond the two-year limitation established by Congress in the Portal-to-Portal Act. The Secretary of Labor had argued that this limitation did not apply to liquidated damages due to the United States Government but only to employes of the contractor, or the producer under the F.L.S.A. We referred to these cases in some of the articles in 1951 in connection with government contracts for agricultural limestone. The typical case which reached the U.S. Supreme Court concerned a chemical company, and is of especial importance because it also involved the employment of child labor—hence a particularly flagrant violation of the law.

Important Supreme Court Decision

The Supreme Court decision dated March 9, 1953, said in part: "On April 17, 1947, the Secretary of Labor issued a complaint charging petitioner with having knowingly employed child labor during the years 1942-1945 in violation of the Act. On February 25, 1949, a Hearing Examiner made a decision in which he found that petitioner had knowingly employed child labor in violation of the Act and was indebted to the United States in the sum of $15,600 as liquidated damages. Under the Rules of Practice of the Department of Labor that decision became final at the end of the twenty-day period within which petitioner had an opportunity to petition the Chief Hearing Examiner for review.

"Nearly a year later—January 27, 1950—this action was brought. The answer tendered as a defense, the two-year statute of limitations contained in §6 of the Portal-to-Portal Act of 1947, 61 Stat. 84, 87, 29 U.S.C. (Supp. V) §255. Both parties moved for summary judgment. The District Court granted petitioner's motion, holding that the cause of action arose when petitioner violated the statute and that the two-year statute of limitations began to run from that date. The Court of Appeals reversed, holding that actions brought by the United States to enforce the child labor provisions of the Walsh-Healy Act are not barred by the two-year limitation period of §6 of the Portal-to-Portal Act. The case is here on certiorari because of a conflict between that decision and Lance, Inc. v. United States, 190, F. 2d 204, and United States v. Lovknit Mfg. Co., 189 F. 2d 454, from the Court of Appeals of the Fourth and Fifth Circuits, respectively.

* * *

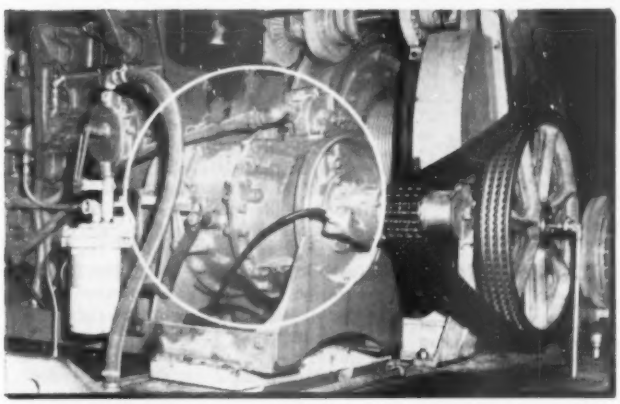
"We do not stop to lay out the entire legislative history of the Portal-to-Portal Act. For the words Congress used in §6 are too precise for extended argument. Three causes of action are covered—claims for 'unpaid minimum wages,' claims for 'unpaid overtime compensation,' and claims for 'liquidated damages,' under three Acts, including the Walsh-Healey Act. The only 'liquidated damages' collectible under the Walsh-Healey Act are collectible by the United States. That marks a difference between that Act and the Fair Labor Standards Act. For under the latter employes may bring suits for double the amount of unpaid wages, plus costs and attorneys' fees. 29 U.S.C. §216(b). That is doubtless why §1 (a) of the Portal-to-Portal Act after summarizing the great burden on employers of the pending employe claims states that 'all of the results which have arisen or may arise under the Fair Labor Standards Act of 1938 . . . may (except as to liability for liquidated damages) arise with respect to the Walsh-Healey Act' and that 'it is, therefore, in the national public interest . . . that this Act shall apply to the Walsh-Healey Act . . .' That statement does no more than emphasize the difference of the problem of liquidated damages under the two Acts. The fact remains that the Portal-to-Portal Act treats claims for 'liquidated damages' under the Walsh-Healey Act precisely the same as it does claims for 'liquidated damages' under the Fair Labor Standards Act, even though the former are enforced exclusively by the Government, the latter by the employes. Perhaps that does not make for an harmonious whole. Perhaps Congress misconceived the problems under the Walsh-Healey Act. However that may be, the present cause of action seems to be precisely described by and expressly included in the words 'liquidated damages under the . . . Walsh-Healey Act.' If this cause of action is not covered by that language, apparently none other is. It is not for us then to try to avoid the conclusion that Congress did not mean what it said. Arguments of policy are relevant when for example a statute has an hiatus that must be filled or there are ambiguities in the legislative language that must be resolved. But when Congress, though perhaps mistakenly or inadvertently, has used language which plainly brings a subject matter into a statute, its word is final—save for questions of constitutional power which have not even been intimated here."

Thus the U.S. Supreme Court reversed the decision of the Circuit Court of Appeals and upheld the decision of the District Court in favor of the employer. It also held that the two years' limitation began with the time of alleged violation of the Act, and not when the Secretary of Labor discovered the alleged violation and began action.

This decision may well have an important bearing on any pending cases against agricultural limestone producers, or aggregate producers, who may have sold their products to the government under the provisions of the Walsh-Healey Act, whether they did it knowingly or not.

YOU'LL BE MONEY AHEAD!

OSGOOD EXCAVATORS with Torque Converters pay for themselves quickly from increased output



TORQUE CONVERTERS are available as optional equipment on ¾ to 2½ yard machines.

In case after case, owners report that modern OSGOOD Machines—with torque converters, air tube clutches, metered air control, and many other advanced features—pay for themselves in a few months out of increased production alone, production over and above that possible with other machines of the same size and capacity. Smoother operation pays off in less wear, less maintenance and longer life, too. For more detailed information, consult your nearest Osgood-General Distributor or the factory.

PCSA

©1953 53030

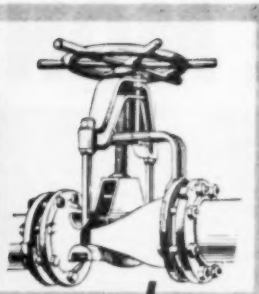
ASK THE MAN BEHIND THE CONTROLS

OSGOOD O-G GENERAL

MARION, OHIO

OVER 100 YEARS OF ENGINEERING PROGRESS

it's
*HINGED
for longer wear



MASSCO-GRIGSBY
RUBBER PINCH VALVES
FOR ABRASIVE PULPS AND
CORROSIVE LIQUIDS
*PATENTED

SIZES 1" to 12" DIA.

WRITE FOR FREE
BULLETIN . . . . .

The Mine & Smelter Supply Co.
DENVER 17, COLORADO

Eliminate 70% to 90%
of Conveyor Downtime

Cedarapids
Schrock
Built by IOWA
MOTORIZED
HEAD PULLEYS
eliminate maintenance on chains, belts, sprockets, Universal drives, countershafts, etc.

U.S. Pat. No. 3548399—Others Pending

EVERYTHING is contained INSIDE the pulley shell!

HERE'S a money-saving departure from conventional conveyor drives. A Cedarapids-Schrock *Motorized* Head Pulley is simply a new application of the long-proven gear reduction drive, with everything . . . electric motor, reduction gears and all moving parts . . . contained inside the drum, completely protected from grit, dirt and weather and with no outside parts or motors to service. 70% to 90% of conveyor trouble and downtime is saved by eliminating the exposed parts necessary with conventional pulley drives. In operation, the pulley shell rotates about the electric motor which is held stationary by a torque arm attached to the conveyor frame. The speed of the shell depends on the combined reduction ratio of the pinions and gears inside the shell. Compact, easy-to-install, job-proved Motorized Head Pulleys are available in sizes from 5 to 30 HP and in various widths.

Find out all the advantages of converting your belt conveyor or belt-bucket elevator installations to *motorized* efficiency before you need head pulley replacements. See your distributor today, or write for Bulletin MP-1.

IOWA
MANUFACTURING COMPANY
Cedar Rapids, Iowa, U. S. A.

Built for sale in Arizona, California, Nevada, New Mexico, Southern Oregon, Southwestern Utah and Texas by
YUBA MANUFACTURING CO.
(Pulley and Sprocket Department)
Benicia, Calif.

Secondary Crushers

(Continued from page 102)

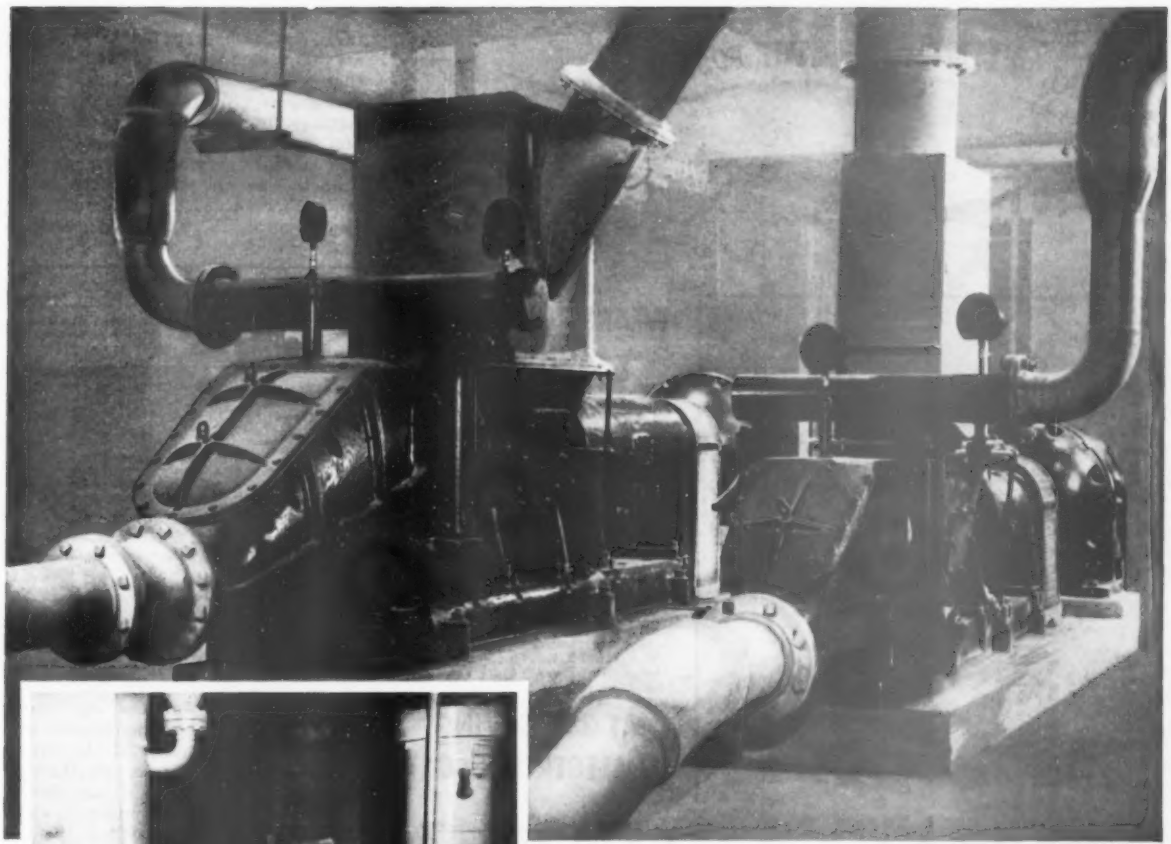
these will depend upon the size of the primary, its setting, the type of secondary to be used, and its setting. It is desirable that the multiple set-up be selected in even numbers, rather than odd; that is, either two or four units, rather than three. The difficulties in achieving an equitable distribution of feed into three units has been amply demonstrated in a number of plants.

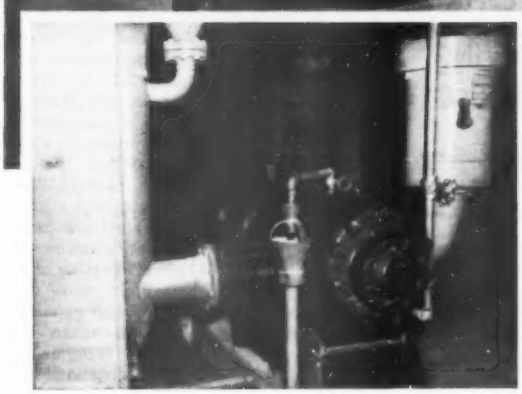
From the standpoint of flexibility there is something to be said in favor of the multiple secondary stage, although the advantages are not so pronounced here as they are in the reduction crushing stages, unless of course the secondary stage is likewise a finishing stage. When the secondary stage is simply an open-circuit step in the over-all reduction flowline, the advantage of the multiple unit rests in the fact that single machines may be taken out of service for repairs without total interruption of the plant operation, although the feed rate must be reduced unless enough excess capacity is installed in this stage to permit cutting one machine out of service without affecting the average flow-rate through the plant. It is questionable if this much excess capacity is ever justified in a two-unit secondary stage; on the other hand, if the stage is to comprise four or more units, it is sound engineering to provide such extra capacity. The answer must in any case be predicated upon the relative importance of uninterrupted full-capacity operation.

Reduction Stages

Much of the foregoing discussion of secondary crushing stages will apply equally well to any succeeding stage, especially so if the stage is to run in open circuit. The cardinal factors of capacity, feed size and product size must be checked in very much the same fashion, keeping in mind the probable difference in types of crushers to be used. Usually, when we arrive at the third stage in a crushing plant, we are dealing with reduction or fine-reduction crushers where the feed size, as established by the open-side setting of the preceding stage, must be checked against the maximum one-way dimension of rock that the reduction crusher will nip. This comparison is usually all that is required to assure an adequate receiving opening, but it should be kept in mind that this maximum nip-dimension is *not* the full radial receiving opening of the reduction-type crusher. In our own lines of reduction and fine-reduction crushers this differential in *full*, and *effective*, receiving opening applies to the Superior McCully reduction crusher, the Newhouse crusher (with full-curve, non-choking concaves), and the Hydro cone crusher. To assist in the selection of machines of these types the following

(Continued on page 124)





Top photo: Two Fuller-Kinyon Pumps installed in a cement plant. One conveys 80 tons of raw materials and the other 360 barrels of finished cement an hour. Lower photo: Fuller Rotary Single-stage Compressor furnishing air for the raw material pump, capacity 1044 c.f.m., 26-lb. pressure.

A combination that's hard to beat . . .

FULLER-KINYON PUMPS and FULLER ROTARY COMPRESSORS

FULLER-KINYON: The system that is recognized as the outstanding means for conveying many types of dry, pulverized materials from processing equipment to storage bins and silos; from storage to packer bins, process, cars, ships, and barges. Also used for unloading from cars, ships, and barges. For certain requirements the system can be remote or automatically controlled. It meets every demand placed upon it—full capacity can be economically maintained up to the maximum conveying distance. Safe, clean, efficient conveying.

FULLER ROTARY COMPRESSOR: This compressor delivers a uniform flow of air, without pulsations, discharging the air directly into the Fuller-Kinyon Pump, without unloaders or air receivers. Connected thus, the power input conforms automatically to the work-load (back pressure) of the conveying system. Air—where and when needed to do the work in an efficient and economical manner.

Why not take advantage of Fuller's 26 years of experience in the field of conveying the next time you have a conveying problem? We'll be glad to work with you and give you the benefit of this experience.

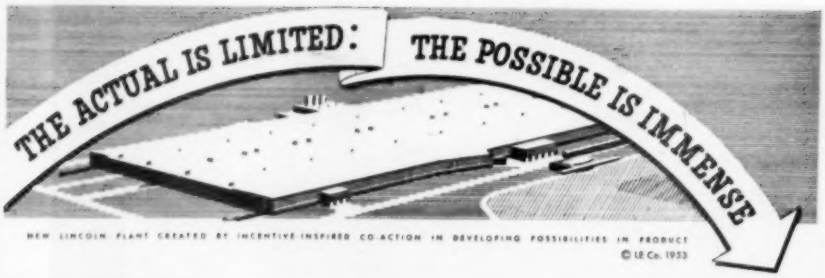
FULLER COMPANY, Catasauqua, Pennsylvania
Chicago 3—120 So. LaSalle St.
San Francisco 4—420 Chancery Bldg.

Fuller

26 YEARS' EXPERIENCE IN PNEUMATIC CONVEYING

PIONEERS OF HIGH-EFFICIENCY VANE-TYPE ROTARY COMPRESSORS

P-140



NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

© LE Co. 1953

WHAT'S YOUR HARDSURFACING NEED?

RESISTANCE to abrasion, impact, rolling or sliding friction? Lincoln has the *right* hardsurfacing electrode for every need of abrasion and impact in the rock field. Averaging 30% less in price per pound than other makes . . . yet, *Lincoln hardsurfacing outlasts other hardsurfacing up to three times longer.*

TYPICAL APPLICATIONS FOR LINCOLN HARDSURFACING ELECTRODES

DIPPER TEETH "Manganweld" "Abrasoweld"
CHAIN LINKS "Hardweld"
AGGREGATE CHUTES "Faceweld"
SPROCKETS "Hardweld"
CRUSHER ROLLS "Manganweld"
ROTARY DRILLS "Tungsweld"

Fig. 2. Dragline Crowfoot, *first built up with Lincoln "Fleetweld 7" mild steel electrode, is then hardsurfaced with Lincoln "Abrasoweld" giving maximum resistance against severe abrasion and impact.*

WEARS THREE TIMES LONGER

Fig. 1. Crusher Roll *surface built up with Lincoln "Manganweld", outlasts other types of hardsurfacing by over 3 to 1. Simple to apply, Lincoln "Manganweld" has resistance to impact and abrasion equal to heat treated cast steel.*

AT 30% SAVING IN ELECTRODE COST

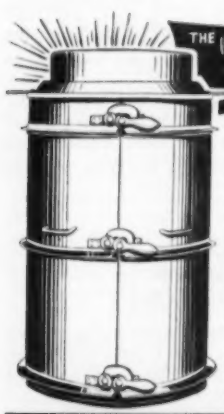
COMPLETE LINE

NEW LINCOLN HARDSURFACING GUIDE

SEND FOR IT

GET THE FACTS. Free Lincoln Hardsurfacing Guide shows which type of hardsurfacing to use for maximum service at lowest cost. Write on your letterhead to Dept. 3402.

THE LINCOLN ELECTRIC COMPANY
CLEVELAND 17, OHIO
THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT



THE "Quinn Standard"

FOR CONCRETE PIPE

The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 35 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that **Quinn pipe forms** and **Quinn mixing formulas** combine to produce the finest concrete pipe at lowest cost.

QUINN HEAVY DUTY PIPE FORMS

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

WRITE TODAY. Complete information, prices, and estimates sent on request.

Also manufacturers QUINN CONCRETE PIPE MACHINES

QUINN WIRE & IRON WORKS 1603 12TH ST. BOONE, IA

(Continued from page 122)

table has been prepared to show the maximum one-way dimension of rock that each machine will nip. These dimensions are for minimum crusher settings. In the case of the Superior McCully and Newhouse crushers they will increase by whatever amount the proposed setting exceeds the minimum. For both of these machines the figures apply to full-curve, non-choking concaves.

Superior McCully reduction crusher		Newhouse crusher	
Size	Maximum one-way feed dimension	Size	Maximum one-way feed dimension
6 in.	3¼ in.	5 in.	2½ in.
10 in.	5 in.	7 in.	3½ in.
18 in.	12 in.	10 in.	5 in.
		14 in.	8 in.

Hydrocone crusher		
	Maximum one-way feed dimension	
Size	Abrasive rock	Non-abrasive rock
222	1 in.	1⅞ in.
322	2 in.	2½ in.
330	1½ in.	2 in.
530	3 ½in.	3¾ in.
436	2 in.	3⅛ in.
636	4 in.	4⅞ in.
548	3 in.	3⅞ in.
848	5½ in.	6 in.

Two sets of maximum-nip dimensions are listed for the Hydrocone crushers; one for abrasive and one for non-abrasive material. An examination of the cross section through the crushing chamber of any flared-topshell crusher will make it clear that the effective receiving opening decreases as the head is raised. When crushing abrasive material, mantle and concave wear is relatively rapid as compared to the wear when crushing non-abrasive rock; furthermore, the wear is, comparatively, more rapid in the lower part of the crushing chamber, in contrast to the more even wear on non-abrasives. Hence, as the head is brought to its top position in adjusting for this wear, the effective receiving opening will be somewhat less for the crusher operating on abrasive rock. The effective openings listed are for the top position of the head; at lower positions the opening will be slightly more.

In making our check of receiving opening vs. discharge opening of the preceding stage, we should observe the same precaution suggested for the primary-secondary combination: the discharge setting against which we check the nip-dimension of our crusher should be the maximum opening at which we have reason to believe the preceding crusher will ever be operated. Usually secondary crushers can be, and are, maintained more closely to the established setting than are the larger primary machines, some of which are without means of adjustment other than resetting of concaves or replacement of mantles; nevertheless it is extremely difficult in actual practice to maintain crusher settings within narrow limits with a few exceptions, and some margin should be allowed for this.

ROCK PRODUCTS FEATURES TIMELY INDUSTRY NEWS EACH ISSUE

THIS PRODUCTION EXPERT WILL WORK FOR YOU FREE

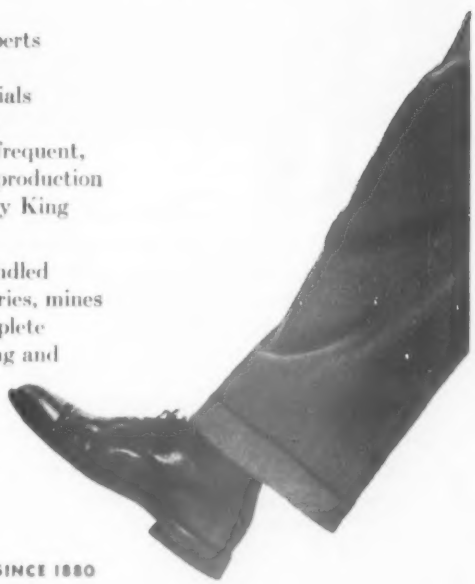
Although his experience and skills are worth real money to you, the services of the Boston Distributor-Representative don't cost you a thin cent!

BOSTON WOVEN HOSE & RUBBER COMPANY BWH

For example, one of our free-of-charge production experts saved a gravel pit operator over $29,000 in production costs in one year. Heavy loads of highly abrasive materials over long distances had shortened conveyor belt life in this pit to a matter of weeks. Wasted man-hours and frequent, expensive belting replacement took a heavy toll in production costs. The Boston Man recommended a Boston Colliery King Conveyor System that is still in operation!

The Boston Distributor-Salesman has successfully handled the belting and steam hose problems of pits, quarries, mines and industrial plants from coast to coast. He has a complete range of tough, durable Boston V-Belts, Flat Belting and Hose to fit every size and type of job. In addition, he can have Belting and Hose custom-tailored to your specifications . . . and delivered fast.

The Boston Man is coming to see you! All it costs to put him to work on your production staff is a few minutes of your time.



BOSTON WOVEN HOSE & RUBBER COMPANY, SINCE 1880

MAIN PLANT: CAMBRIDGE, MASS., P. O. BOX 1071, BOSTON, MASS.

Distributors of a Complete Line of Mechanical Rubber Products in All Principal Cities

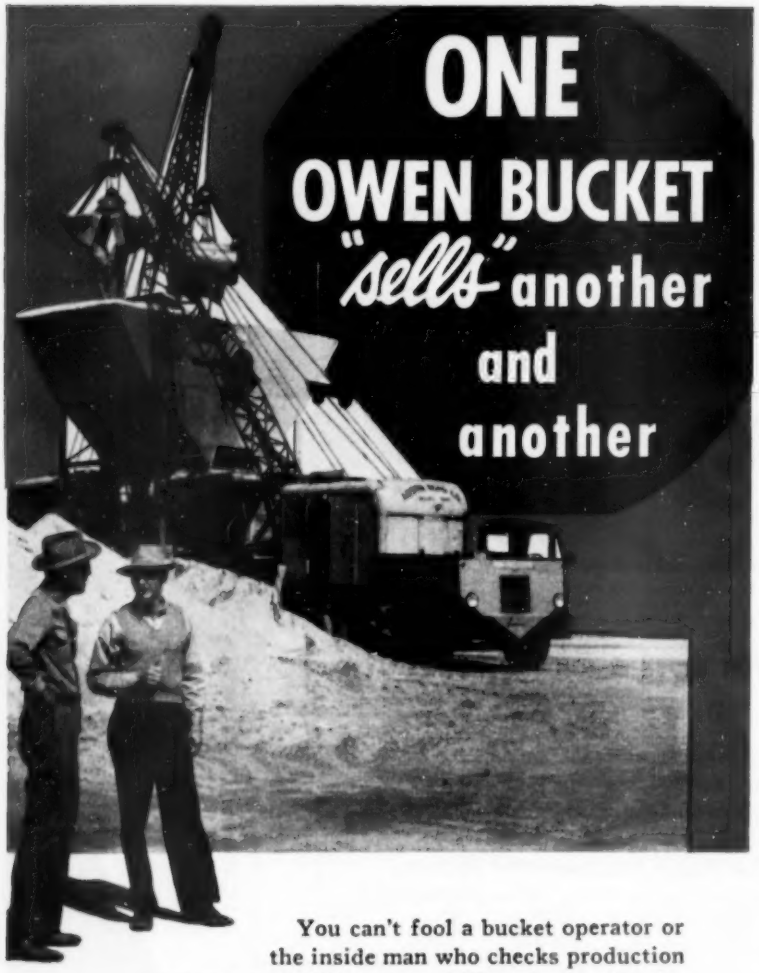
V-Belts & Sheaves

Conveyor Belting

Transmission Belting

Elevator Belting

Steam Hose



You can't fool a bucket operator or the inside man who checks production records and OKs upkeep bills. That's why the first Owen Bucket generally leads to the purchase of additional Owen Buckets.

High production is literally visible to the eye at each grab and low maintenance costs are apparent by the absence or infrequent appearance of repair bills.

Based on repeat order records we say—"Buy your first Owen Bucket and it is more than likely that Owens will become your 'standard' thereafter."

BUCKETS AND GRAPPLES
Write for Catalog

THE OWEN BUCKET CO.
9040 Breakwater Avenue • Cleveland, Ohio
Branches: New York Philadelphia Chicago Portland, Calif. Fort Lauderdale, Fla.

MANUFACTURERS NEWS

Rogers Iron Works Co., Joplin, Mo., announces the retirement of Charles B. Rogers as president of the company, which was founded by his father in 1901, and his election as chairman of the board, after more than 50 years of service. Mr. Rogers joined the company in 1902 following graduation from the Missouri School of Mines, Rollo, Mo., and has served as president since 1926. Under his direction, the firm has increased its operations by the purchase of the Joplin plant of the United Iron Works Co., the Central Foundry Co. and the Joplin Steel & Malleable Co. The company has pioneered many new developments in machinery for rock crushing and mining, among them being mechanized drilling equipment, overhead eccentric jaw crushers, and portable and stationary crushing machinery.

Charles B. Rogers

Olin Industries, Inc., East Alton, Ill., announces that B. E. Bassett, vice-president, has been appointed general manager of the United States Defense Corp., an Olin subsidiary, which is operating the ammunition division of the St. Louis ordnance plant. Ralph A. Ostberg, who joined the company in 1952 as assistant to the executive vice-president, has been named vice-president for production.

Marion Metal Products Co., Marion, Ohio, announces the election of Gilbert E. Herr as president and general manager of the company. He succeeds the late J. Malcolm Strelitz, president since 1930, who died recently. Joseph L. Halberstein has been appointed chairman of the board of directors. He was formerly secretary and will be succeeded in this position by L. E. Oberlander.

Caterpillar Tractor Co., Peoria, Ill., announces that L. C. Allenbrand has been appointed general manager of the York plant. He was formerly manager of the merchandise department and will be succeeded by Frank Bovenschulte, formerly head of the pricing division of the department. Hans Erich has been made factory manager of the York plant.

Koehring Co., Milwaukee, Wis., announces the appointment of K. R. Chandler as district representative in Utah, Arizona, Nevada and California, with headquarters in Stockton, Calif.

The Master Builders Co., Cleveland, Ohio, announces that E. L. McFalls has been elected president of the company to succeed S. W. Flesheim who has been named chairman of the

Tuffy®

Saves Nearly 50% on Scraper Rope Costs!

"Outlasts (Other Rope) Almost 2 to 1"

Says Owner of a Middlewestern Construction Company

(Name on Request)

From his records of yardage and service life, this Nebraska construction company owner learned that he could save nearly 50% on scraper rope costs by switching to Tuffy! And there's a good reason why: Tuffy is specially made to stand up under the stresses and strains of wheeled scrapers. It's flexible to withstand more sharp bending and to wind snugly and smoothly on the drums. It is designed to resist drum crushing caused by cross-overs. And Tuffy is easy to order — just specify length, diameter and "Tuffy."

MAIL COUPON TODAY

UNION WIRE ROPE CORP.

Specialists in Wire Rope and Braided Wire Fabric

2156 Manchester Ave., Kansas City 3, Mo.

Please send my FREE illustrated folder on Tuffy Scraper Rope.

Firm Name_____

By_____ Title_____

Address_____

City_____ Zone____ State_____

C-10

board. B. R. Wood has been appointed vice-president in charge of merchandising. Mr. Flesheim, who is a founder of the company, has been president since 1914. Mr. McFalls was formerly executive vice-president. Dr. E. W. Scripture, Jr., has been reelected vice-president of research and chief of operations, and F. J. Bates, secretary and treasurer. Other new appointments are: William B. Phillips, assistant to the president; Edward J. Demson, general sales manager; George B. Southworth, assistant general sales manager; Vernon S. Andrews, industrial sales manager; J. E. Gingerich, general plant manager in charge of Cleveland, Buffalo and Toronto plants; and I. V. Troutman, operations engineer.

St. Regis Paper Co., New York, N.Y., has appointed Howard C. Peterson, Jr., as district manager of the Southwestern sales district of the Multiwall bag division. He succeeds H. S. Thodes, who has been appointed general manager of the field engineering department of the engineering and machine division. Mr. Rhodes succeeds H. S. Hangen, who has been named assistant general manager of the engineering and machine division, with headquarters in New York. B. W. Peake continues as manager of field engineering in the Birmingham area.

The Colorado Fuel & Iron Corp., New York, N.Y., has completed acquisition of the plants, inventories and business of John A. Roebling's Sons Co., Trenton, N.J., which will be operated by John A. Roebling's Sons Corp., a newly-formed and wholly-owned subsidiary of Colorado Fuel & Iron. Charles Allen, Jr., has been named chairman of the board, A. F. Franz has been named president, and Charles Roebling Tyson, executive vice-president.

Bucyrus-Erie Co., South Milwaukee, Wis., announces the appointment of Cleveland Bros. Equipment Co., Harrisburg, Penn., as distributor in the part of Pennsylvania east of and including the counties of Tioga, Lycoming, Clinton, Centre, Huntingdon and Fulton, and west of and including Wayne, Pike, Monroe, Carbon, Schuylkill, Lebanon and Lancaster counties.

Baldwin-Lima-Hamilton Corp., Construction Equipment Div., Lima, Ohio, has opened a new district office and warehouse in Atlanta, Ga., to replace the office-warehouse at Memphis, Tenn. Fred L. Maus continues as district manager of the territory.

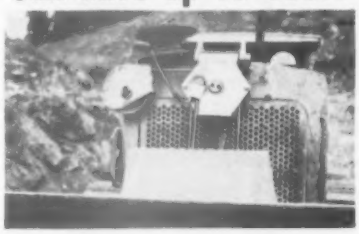
Hewitt-Robins, Inc., Stamford, Conn., has appointed C. Lynn Frost advertising manager of all products. He joined the company as assistant advertising manager in 1949.

Rust-Oleum Corp., Evanston, Ill., has appointed Thomas S. Walsh as Eastern factory representative in New York, Bronx, Queens, Kings, Nassau, Richmond, Suffolk, Orange,

NOW

Tuffy®

Can Save Up To 300%



Goodbye To Waste of Good Dozer Rope!

Tuffy Dozer Rope is specially constructed with the extra stamina needed to stand up under the rough dozer treatment. But Tuffy engineers went even further to cut your costs! They devised a special reel to carry 150' of Tuffy Dozer Rope on the tractor. When 10' or so of rope is crushed or cut on the drum, you just feed enough from the reel to replace the damaged part! The cut can be made and the machine back in use in 15 to 20 minutes—less than half the time normally needed! Figuring roughly, there are two Dozer Ropes to a reel. This gives you an approximate ratio of 6 to 2 . . . about 300% increased service! Mount a reel of Tuffy Dozer Rope just back of the wedge socket on your Dozer and see how much longer service you get! ½" rope, furnished in 150' reels.

UNION WIRE ROPE CORP.

Specialists in Wire Rope and Braided Wire Fabric

2156 Manchester Ave., Kansas City 3, Mo.

Please send me the FREE illustrated folder on Tuffy Dozer Rope.

Firm Name_____

By_____ Title_____

Address_____

City_____ Zone____ State_____

C-9

Make Your Own Lightweight Aggregate at LOW Cost!

Typical Dwight-Lloyd Lightweight Aggregate Sintering Plant.

Aggregate cakes leaving pallets at discharge end of sintering machine.

Make your own expanded aggregate—light, strong, stable and with superior wet-dry contraction characteristics—from clay, shale, fly ash and other suitable residues or waste materials, using the

DWIGHT-LLOYD® SINTERING MACHINE

- **LOW PRODUCTION COSTS**—Automatic operation, no skilled labor required.
- **CONTINUOUS OR INTERMITTENT**—Operate 24 hours a day or intermittently without loss of efficiency, standby or restarting costs.
- **LONG LIFE—LOW MAINTENANCE**—Many plants in continuous operation for over 30 years with exceptionally low maintenance.
- **CAPACITIES**—Standard machines available from 250 to 2,500 cubic yards per day.

Pilot Sintering Plant at your service for testing materials under actual operating conditions. Let us test your raw materials and offer our recommendations to meet your requirements.

SM

LIGHTWEIGHT AGGREGATE DIVISION

SINTERING MACHINERY CORPORATION

135 SINTER AVENUE NETCONG, N. J.

Rockland, Ulster, Dutchess, Sullivan, Putnam and Westchester counties in New York State; and the counties of Sussex, Passic, Bergen, Morris, Essex, Hudson, Somerset, Union, Middlesex and Monmouth in New Jersey and Fairfield county in Connecticut.

Caterpillar Tractor Co., Peoria, Ill., recently held a press, radio and TV preview of its No. 6 shovel at the Conrad Hilton Hotel in Chicago, Ill. Jerry Cook, news editor, made the welcoming speech and introduced speakers W. K. Cox, advertising manager, who spoke on "Caterpillar's 1953 Market Outlook," and Ed Howard of the sales development division, who talked about "The No. 6 Shovel on the Job."

Koehring Southern Co., Chattanooga, Tenn., recently held a 6-day open house at its new manufacturing plant in Chattanooga. Hosts for the event included officers, directors and members of Koehring Co., Milwaukee, and

New manufacturing plant where open house was celebrated

subsidiaries C. S. Johnson Co., Champaign, Ill.; Kwik-Mix Co., Port Washington, Wis.; and Parsons Co., Newton, Iowa. Program included guided tours through the plant, special equipment exhibit featuring latest model excavators, cranes, dumptor, mixers, batchers, cement charges, clamshell and concrete buckets and fork lifts. Visitors also received a preview showing of two new models of shovels and cranes built at the new plant. A special reception and dinner was held for local public officials, civic, business and industrial leaders, and for publishers and representatives of the technical trade press. One day was set aside for "family day" to wel-

HAYWARD BUCKETS

WON'T QUIT OR CAUSE TIME OUT

A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

THE HAYWARD COMPANY
202-204 Fulton Street
New York, N. Y.

CONCRETE BURIAL VAULTS

AMERICA'S FINEST MOLDS AND LOWERING DEVICES

BERG VAULT SYSTEM

TERRITORY FRANCHISES

BERG VAULT CO.

EQUIPMENT DIVISION

1520 LUCAS HUNT RD. ST. LOUIS

come families and friends of plant workers and for the general public, another day was given over to contractors and other users of construction and material-handling equipment from the southeast, and two days were set aside as combination open house and sales meeting for Koehring distributors. County commissioners from Georgia were given a reception on the final day of the open-house celebration.

Fairbanks, Morse & Co., Chicago, Ill., announces that Robert H. Morse, Jr., formerly a director and chairman of the executive committee, has been elected president and general manager of The Canadian Fairbanks-Morse Co. Ltd., Montreal, Canada. He succeeds the late George M. Niven. Other officers elected include: George R. Wyer, executive vice-president; J. E. McQuilkin, assistant to the president; C. W. Coughlin, vice-president of industrial sales, and H. C. Reindfleisch, vice-president of consumer sales.

R. G. LeTourneau, Inc., Peoria, Ill., has announced the appointment of J. A. Vincent as eastern area sales manager, with headquarters in Peoria, Ill. He was formerly district sales representative for the southeastern area and will be succeeded in this position by Howard R. Gilmore, who will make his headquarters in Atlanta, Ga.

Macwhyte 6 x 36 WS PREformed Right Lang Lay Monarch Whyte Strand with IWRC.

What's unusual about this machine?

There are 265 wires in this particular rope construction. That means 265 individual moving parts.

The 8 different sizes of wire are all drawn to precise diameters. Each wire is protected with lubricant applied during fabrication of the rope.

Macwhyte makes a thousand and one ropes to meet the needs of every type of equipment. Each is built with the exacting care that long, low-cost service demands. Prompt recommendations on request.

GET THE RIGHT ROPE FOR YOUR QUARRY EQUIPMENT

MACWHYTE WIRE ROPE

10418

Ask for G-15 Handbook

MACWHYTE COMPANY
2949 Fourteenth Avenue, Kenosha, Wis.
Mill depots: New York • Pittsburgh Chicago • St. Paul • Fort Worth Portland • Seattle • Los Angeles Distributors throughout U.S.A.

CHAMPION

"Wear Devil A" Electrodes increase hook service life as much as three times!

Li'l Champ says:

Edges are hard surfaced prior to placing equipment in service.

Let us tell you more about "Wear Devil A" Electrodes. Write for full information.

Field tests prove that **"Wear Devil A"** deposits on the wearing edges afford impact and abrasion resistance far superior to that of non surfaced grappling hooks.

Due to excellent bond between weld and base metal, **"Wear Devil A"** deposits will not spall or crack despite the most severe service conditions.

When hooks have become worn they can be resurfaced without having to remove any of the old deposit.

Hardness averages 53 — 58 Rockwell C.

THE CHAMPION RIVET CO.
CLEVELAND 5, OHIO • EAST CHICAGO, IND.

a SQUARE beyond compare!

This close-up of Hendrick Perforated Metal Plate shows no ordinary screen. No other screening medium can equal it for uniformity of mesh, for non-binding clearance and for unparalled long service life.

Flat or corrugated Hendrick Perforated Metal is available in any desired shape and size of perforations in high carbon steel and stainless steels and other commercially rolled metals. Decks can be changed fast and efficiently – cutting time and labor costs.

For more details write for information.

Hendrick
MANUFACTURING COMPANY
47 DUNDAFF STREET, CARBONDALE, PA. • *Sales Offices in Principal Cities*

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids

Cheek Plates Rebuilt with
MANGATONE N.M.
stop another expense leak

Cheek plates used in jaw type crushers take very little impact but a lot of severe abrasion. Compared to the price of crusher plates, the cost of cheek plates is of course materially less. Because of this it seems that too many of us disregard the subject of Cheek Plates.

But HOW MANY TIMES A YEAR DO YOU REPLACE THEM? It will probably surprise you considerably when you investigate.

Anyhow, they can be rebuilt with Mangatone N.M. and at a very substantial saving. Ask our field man for more information.

RESISTO-LOY CO. *Manufacturers*
Grand Rapids 7, Michigan

Weather Resistant

Hammond Multi-Walls assure complete protection of your products in any kind of weather. Being water resistant, they keep out snow, rain or sleet . . . keep contents dry and safe until bags are opened, and your products used. Why not call in the Hammond man near you. His main interest is in recommending the *right* Multi-Walls for the exact requirements of your products. Prompt deliveries are assured.

For Multi-Wall bags,
"make it a habit to depend on Hammond"

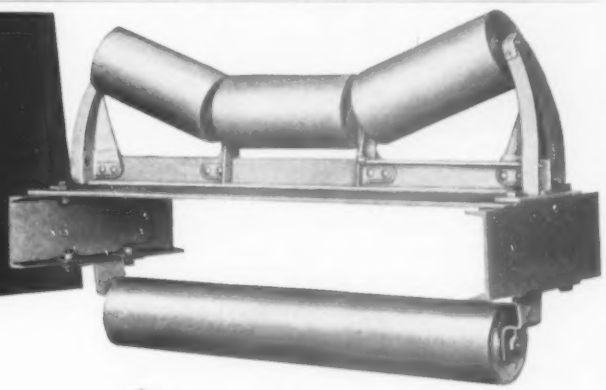
Hammond Multi-Walls

HAMMOND BAG & PAPER COMPANY

General Offices: Wellsburg, W. Va.
Plants in Wellsburg, W.Va., and Pine Bluff, Ark.

Representatives in the following cities: CHICAGO, ILL. • BLUEFIELD, VA. • CHARLOTTE, N. C. • KANSAS CITY, MO. • MINNEAPOLIS, MINN. • LIGONIER, PA. • WASHINGTON, D. C. • NEW YORK, N. Y. • AKRON, OHIO • HOUSTON, TEXAS

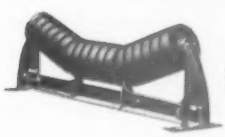
LINK-BELT IDLERS



. . . the long-life answer to higher belt conveyor efficiency

WHEN your materials move on Link-Belt roller bearing idlers, you're assured of free-rolling efficiency. And because friction loss is minimized, they require less power to operate. You'll like their low maintenance, too. Grease-in-dirt-out seals preserve lubricant. Dozens of other design features promote long life.

Choose from a full line of 20° and 45° troughing idlers in a variety of styles. Belt-training and flat belt idlers are also furnished in a wide range of roll diameters and belt widths. See your nearby Link-Belt sales representative or distributor for new Book 2416.



Series "100" troughed rubber cushion idler.

Series "100" troughed belt-training idler, positive action type.

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, Duluth 2, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Stores and Distributors in Principal Cities. 13,210

LINK-BELT

ROLLER BEARING IDLERS

Longer Life, Lower Cost

Allis-Chalmers Power Units Never Need Reboring

Not only do Allis-Chalmers engines last longer because of their short-stroke design and slower running speeds . . . but they never need expensive reboring. You merely replace the wet, removable cylinder liner, ring and piston as a unit. With this installation all cylinders are kept the same size — engine stays in balance. Replacement can be made on location by any mechanic. Think of what this can mean to you in savings on maintenance and time.

Replaceable cylinder sleeves are standard equipment on all Allis-Chalmers power units . . . four sizes from 24.5 to 74.00 hp. See your dealer for all the facts on these high-torque, low-cost and low maintenance engines.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

"CROSS"

LEADS THE WAY IN ANY HEAVY DUTY SCREENING PROBLEMS

"CROSS" ROUND SQUARE OR HEXCREEN PERFORATED STEEL PLATES AND SECTIONS PROVIDE TOP PERFORMANCE AT ALL TIMES

Look for this Stamp on all "Cross" Products

the Sign of PLUS QUALITY for PLUS PERFORMANCE

FOR VIBRATING • SHAKING REVOLVING SCREENS

CROSS Field Engineer Services and Technical Data on Request

CROSS ENGINEERING COMPANY
MANUFACTURERS • CARBONDALE, PENNSYLVANIA • TELEPHONE: 300
"CROSS" SERVICE AGENCIES in Principal Cities
New York, N. Y. — 101 Park Ave. — MUrray Hill 5-0253

HINGED PLATEGRIP
BELT FASTENER No. 500

For Heavy Conveyor Belts of changing length

These heavy-duty belt fasteners make a strong, flexible joint in conveyor belts, belts of any width and of from 3/8" to 1/2" thickness. They offer special advantages in mines, quarries or industrial set-ups where length or position of belt is frequently changed, because sections can be removed or added at will. Joints are opened for this purpose by simply pulling out the hinge pin.

Easily and quickly applied on the job or in the shop. Special design gives deep compression into belting and smooth, flush joint.

Write for Circular.

ARMSTRONG-BRAY & CO.
5386 NORTHWEST HIGHWAY CHICAGO 30

CONCRETE PRODUCTS

A SECTION OF ROCK PRODUCTS

CONCRETE UNITS · READY-MIXED CONCRETE

Plant and storage yard of V. Paturzo Bro. & Son, Inc., Baltimore, Md.

Virginia Cement Block Company

GETS "A MUCH BETTER BLOCK" with DURAPLASTIC*

I. E. SEPPI of the Virginia Cement Block Company, Virginia, Minn., says, "We find Atlas Duraplastic Cement reduces breakage at the machine to a minimum and produces a much better block in appearance and strength." Left, at the machine, Wilho Seppi is making Duraplastic block.

With Duraplastic you can make a more cohesive, rubbery mix that holds together better, feeds easily through machines. What's more, users report increased resistance to passage of water through finished products. No wonder Duraplastic Cement is widely preferred for concrete block, brick, pipe, drain tile and silo staves!

And gets orders for jobs like this:

"Thrifty" says:
When you can give your customers a better block... and have fewer culls and throwbacks at the same time, it really pays to insist on Duraplastic. That's why Virginia Cement Block Company uses it exclusively.
"Nifty" says:
Clean, true edges and corners of Duraplastic-made blocks helped Virginia Cement Block Company land the order for this big warehouse in Hibbing, Minn.

YET DURAPLASTIC COSTS NO MORE

It sells at the same price as regular cement and requires no unusual changes in procedure. Complies with ASTM and Federal Specifications. For descriptive booklet, write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

OFFICES: *Albany, Birmingham, Boston, Chicago, Dayton, Kansas City, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Waco.*

** "Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.*

ATLAS® **DURAPLASTIC**
AIR-ENTRAINING PORTLAND CEMENT

CP-D-152

Makes Superior Concrete Products at No Extra Cost

THE THEATRE GUILD ON THE AIR — *Sponsored by U. S. Steel Subsidiaries — Sunday Evenings — NBC Network*

INDUSTRY NEWS

Masonry Research

THE NATIONAL CONCRETE MASONRY ASSOCIATION recently announced that it has completed arrangements with the University of Wisconsin for a cooperative research project on the structural properties and performance of reinforced concrete masonry. The investigation is expected to continue for about two years and will be in direct charge of Jesse Saemann, Department of Mechanics, under the general direction of Prof. George W. Washa, University of Wisconsin, and R. E. Copeland, director of engineering, N.C.M.A.

After completion of the tests, the results will be analyzed and presented in such form that reinforced concrete masonry units can be designed for a given set of conditions. Recommended construction procedures for making up such units in the field or at the plant will also be given. The results of this study are expected to provide a sound basis for the promotion of many additional uses for concrete masonry units in the fabrication of beams, columns, walls and slabs.

Autoclave Building Products Meeting

THE AUTOCLAVE BUILDING PRODUCTS ASSOCIATION is holding a meeting May 18, 1953, at the Palmer House, Chicago, Ill., for the purpose of organizing committees to promote research work and to work in cooperation with the A.C.I. Committee 716 (on high-pressure steam curing), regarding standards, specifications and research work for the promotion and improvement of concrete products. Committees will be set up to develop an association research program, finance and to handle other activities.

Block Machine Owners Meet

CALIFORNIA AND NEVADA Columbia block machine owners recently held their first annual convention in Burbank, Calif., with over 20 plants represented. Principal speaker at the meeting was Walter Neth, general sales manager of the Columbia Machine Works of Vancouver, Wash., who discussed the latest factory methods, and the newest improvements on the current model of the Columbia block machine. The speech was followed by a round-table discussion.

Versatile Concrete Brick

A VERSATILE CONCRETE BRICK has been developed by Francis Flowers, building material machinery manufacturer, Gloucester, N.J. Use of the brick is claimed to effect savings of up to one-third in labor cost and also substantially reduce materials cost. The 24- x 3½-in. brick, produced in thicknesses of 1½, 2½ and 3½ in., are available in a variety of pastel colors, with each brick having three different types of surfaces—one side smooth, and the other side and top, textured, all of which can be used interchangeably. The brick are said to be easily broken by the mason into any desired lengths. The different sizes and combinations of surface textures can be blended to produce any desired decorative effect for either interior or exterior use. The inventor of the brick has designed and built a machine which has a capacity of 1500 brick per day.

The decorative effect of the above fireplace was achieved by blending brick of different sizes and surface textures

Plant Expansion

MAULE INDUSTRIES, INC., Miami Beach, Fla., large producer of concrete block and other concrete products, has recently acquired ownership of Miami Crushed Stone Co. and several of its subsidiaries, the Materials Sales Corp., Peninsular Concrete Co., Handley Supply Co., and Tropical Farms, which owns the stone-bearing acreage around the Miami crushed stone plant. Reserves obtained with the purchase are said to be sufficient to serve the plant for 25 to 30 years. The newly-acquired plant has a current capacity of more than 1,000,000 cu. yd. of crushed stone per year. J. H. Buchanan, president of Maule, stated that his company's interest is to "extend our coverage in the building materials field." Maule is also expanding its Broward quarry near Fort Lauderdale to triple plant capacity.

Cover Picture

V. PATURZO BRO. & SON, INC., Baltimore, Md., has taken every opportunity to mechanize its operations. On this month's cover of CONCRETE PRODUCTS is shown one of this company's haulage units, a Towmotor fork lift truck, carrying a 5000-lb. load of block in the storage yard.

BOWIE READY-MIX CONCRETE CO. recently began operations at its new plant in Bowie, Texas. In addition to ready-mixed concrete, the company will produce concrete drain tile and septic tanks. As one of the company's first major projects, it will supply the concrete for the foundation of the Bowie Gasoline Co.'s new refinery.

ATLAS READY-MIX recently began production at its ready-mixed concrete plant in Bismarck, N.D. Plant facilities include a batching plant and a fleet of seven transit-mixer trucks. The firm has specialized in concrete gutters, curbings and sidewalks. Owner of the plant is J. J. Igoe, also owner of the Igoe Construction company.

HAYDITE CONCRETE PRODUCTS CO., McNear's Point, Calif., formerly owned by G. F. Steigerwalt, has been sold to McNear Co., which will operate the plant under that name. William H. Thomas has been named plant manager and Miller McNear is plant superintendent.

RAHNS CONCRETE PRODUCTS CO. was recently established at Rahns, Penn., by Christopher Scharpf and Joseph Schawders. Various concrete products, including concrete block and fence posts, will be produced at the new plant.

LAKE COUNTY READY-MIX CO., which has plants at Upton and Crystal Lake, Ill., has been sold to Consumers Co., Chicago, Ill. Cost of the transaction was reported to be $500,000.

WARREN CONCRETE PRODUCTS is a new firm established at Omaha, Neb., by Elmer G. Warren. The company will produce "Homeward" precast concrete steps and other concrete products.

NORLIN CONCRETE CO., Sioux Falls, S.D., formerly part of the recently dissolved Acme Concrete Co., has begun operations which will include concrete construction and road paving materials.

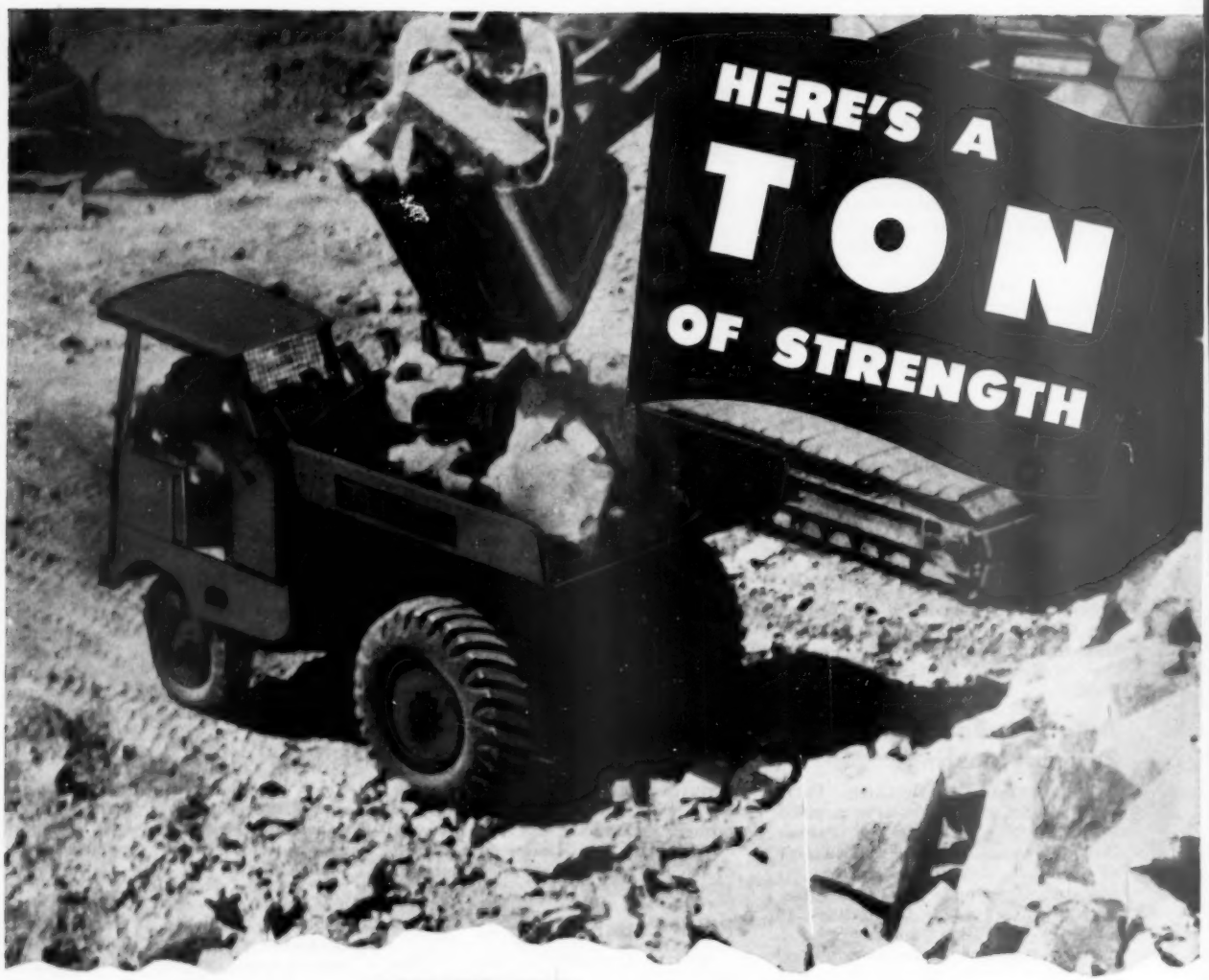
BETHANY FALLS TRANSIT MIX CONCRETE CO. has added a concrete and haydite block plant to its ready-mixed concrete facilities at Bethany, Mo.

S. M. CAMPBELL CONCRETE CO., Owosso, Mich., producer of concrete block and burial vaults, recently celebrated its 50th anniversary.

BONA FIDE CONCRETE CO. is a new ready-mixed concrete company established at Jackson, Mich., by Martin and Victor Saper.

R. E. WEAR & SON, Montrose, Colo., has added a ready-mixed concrete plant to its concrete and general contracting business.

COON CERTIFIED CONCRETE, Luzerne, Penn., has opened a new ready-mixed concrete plant at Penobscot, Penn.



FOR EVERY TON OF PAYLOAD . . .

When you're loading 1½ to 2½ yards of rock at a pass, hauling units need plenty of strength to last. With Koehring heavy-duty Dumptors, you have a ton of net vehicle weight for every ton of payload capacity. Sides, ends and bottom of all-welded 6-yard body are heavily reinforced with 4" channel ribs. Triple strength steel-oak-steel bottom cushions shocks of rock loading. Free swinging kick-out pan adds another tough steel plate to Dumptor bottom for extra strength.

There's plenty of strength, too, in the Dumptor chassis to take the constant pounding of heavy loading and rough off-road hauling. Heavily-trussed 8" ship channels make up the main frame. 4" chrome steel drive axles are protected by heavy-cast one-piece steel housing. "I"-beam steering axle is cast alloy steel. There are no leaf springs — just one big double-coil chassis spring on the steering axle — none on drive axle. Big drive tires eliminate need for more springs, absorb loading and hauling shocks, save spring maintenance.

Even with this heavy-duty construction, Koehring Dumptors have 6 HP per ton of gross weight — accelerate fast, pull through soft ground and up grades with less shifting — climb 24% grades fully loaded. For less down-time, more work-time, put heavy-duty Dumptors on your jobs.

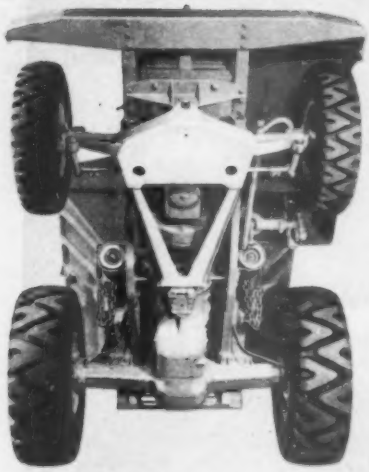
CK139

KOEHRING HEAVY DUTY

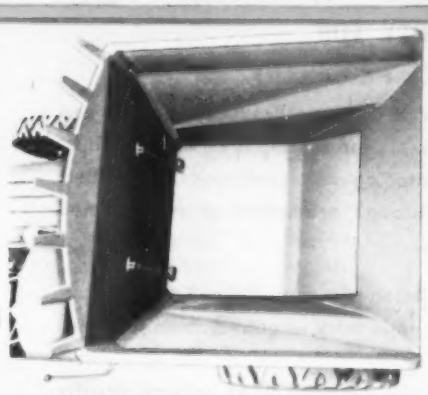
SEE YOUR KOEHRING DISTRIBUTOR FOR COMPLETE FACTS

KOEHRING DUMPTOR®

KOEHRING COMPANY, MILWAUKEE 16, WIS. • SUBSIDIARIES: • KWIK-MIX • PARSONS • JOHNSON



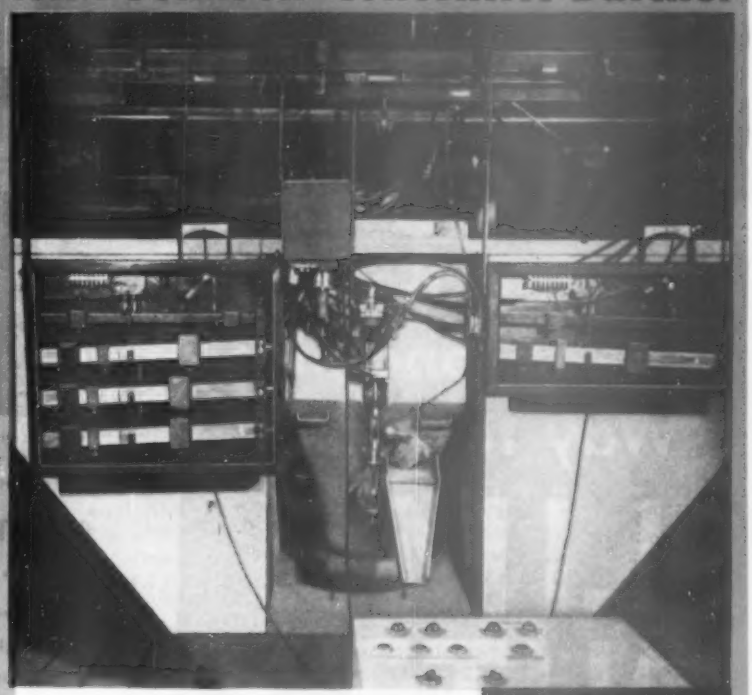
NO "SOFT SPOT" on Dumptor's underside . . . 1-piece, cast steel housing protects drive axle and enclosed chain drive. Wishbone supports the skid plate . . . shields the radius rod and the engine crank case . . . and supports the oscillating steering axle.



KICK-OUT PAN adds an extra 3/16" high-manganese steel plate on top of sturdy Dumptor bottom . . . breaks suction of sticky materials for fast, clean dump. Big 8' x 8' top gives easy-to-hit target for fast loading over the side or end . . . with less spillage.

1-SECOND GRAVITY DUMP . . . no slow-acting body hoists . . . no body-hoist maintenance . . . plus same speeds forward and reverse for no-turn shuttle hauling keep production yardage high, costs low with Dumptors.

CENTRAL CEMENT FEED with Johnson Concentric Batcher



Automatic
AIR-RAM OPERATED

Finger-tip panel controls air rams on aggregate and cement fill valves and discharge openings . . . provides fully automatic operation . . . assures extreme accuracy at top batching speeds. Batcher also can be furnished with semi-automatic or manual controls.

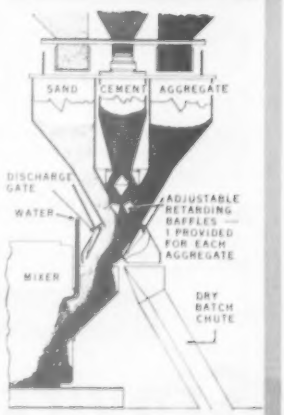
● Central cement feed with Johnson Concentric Aggregate-Cement Batcher prevents "gumming", reduces dusting, pre-shrinks materials. All ingredients are intermingled as they flow through discharge.

● Cement, concrete's most expensive ingredient, is weighed individually on precision-beam scale in a separate batcher hung within the aggregate hopper. Aggregates are weighed on accumulative dial scale, or on individual weigh-beam scales.

● Adjustable rate of discharge of each aggregate permits accurate ribbon-feeding . . . cement flow cuts off just ahead of final weight, prevents overshooting.

● Dual discharge is available for charging 2 stationary mixers, or 1 stationary mixer and a truck mixer or dry-batch truck.

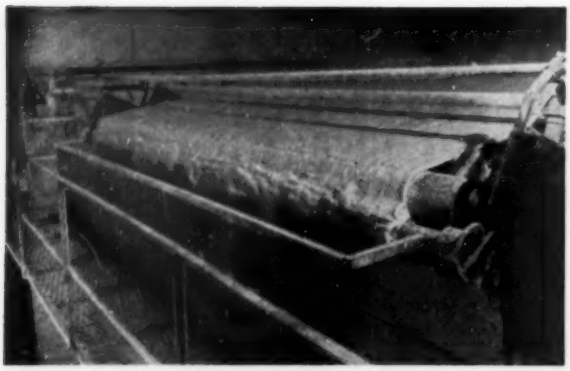
● 2 to 5 cu. yd. sizes can be arranged for 2 to 4 aggregates, plus 1 or 2 types of cement . . . have fully-automatic, semi-automatic or manual controls. Let your Johnson distributor show you all the production advantages you will get with one of these patented Concentric Batchers in your plant.



JOHNSON KNOW-HOW PRODUCT

C. S. JOHNSON COMPANY
(Koehring Subsidiary) CHAMPAIGN, ILLINOIS

CONCRETE PLANTS • BINS • HOPPERS • ELEVATORS • SILOS • BUCKETS



TOP LEFT: Discharge of Processed Lime.
TOP RIGHT: Underside of slaker, vibrating screen.
LOWER RIGHT: Coil springs on filter drum.

Faster - Better More Economical Way to Make LIME PUTTY

A NEW, REVOLUTIONARY PROCESS. DIFFERS FROM PLANTS NOW IN USE IN THE FOLLOWING PRINCIPAL WAYS:

- Eliminates the large, expensive "aging" vats or tanks, along with time for cooling and dewatering the putty.
- Putty produced through this process requires no "aging." The time element is literally reduced from days to minutes.
- The putty is completely conditioned for immediate use by the mason as it leaves the machine.
- Samples of putty taken from any part of the machine are always uniform with respect to coolness and consistency.
- In the case of ready mixed mortar plants, the Miller-Komline Process can be used satisfactorily with either high calcium or dolomitic quicklime.
- Greater capacity per dollar of investment is obtained with this process over other putty plants employing the "aging" tank principle.
- It is very simple to operate. It is low cost.

OPPORTUNITY FOR READY-MIX PRODUCERS

Ready-mixed Concrete Producers having surplus truck mixers can readily diversify their business, guaranteeing more continuous use of their equipment through production of ready-mixed brick mortar.

This revolutionary new Miller-Komline Process assures uniformity of quality, and produces a cool putty ready for immediate use by plasterer or bricklayer. Lime putty of varying density can be produced according to customer requirements.

Now you can produce high-quality Lime Putty in a fraction of the time, with greatly reduced work, less ground space for equipment, and at lower cost. Two men can operate the plant.

WRITE FOR INFORMATION ON HOW THIS NEW PROCESS CAN INCREASE YOUR VOLUME AND PROFITS

EXCLUSIVE PATENT LICENSES ISSUED TO QUALIFIED PARTIES

SERVICE ENGINEERING COMPANY

HOWARD B. BISHOP, President

SALES ENGINEERS FOR THE MILLER-KOMLINE PROCESS

SUMMIT – NEW JERSEY

Here's why the famous

Hi-Lo CONCRETE TRANSPORT MIXER CO.

STATIONARY DRUM REVOLVING BLADE TRUCK MIXERS cut costs per load, boost your profit!

1. *Open top, stationary drum mixer, for Visible Mixing Action.*
2. *Welded, reinforced drum. Only mixer with replaceable liners of abrasive-resistant steel.*
3. *Sliding gate for accurate control. No seal to replace!*
4. *Full 180° radius swing chute, with attachable extension.*
5. *Alloy steel main shaft, heat-treated for maximum strength.*
6. *Heavy duty, self-aligning tapered roller bearings. Patented non-leaking, self-tightening packing glands.*
7. *Rugged roller chain final drive, completely guarded automotive-type spiral bevel gear reduction. Silent chain intermediate reduction drive.*
8. *Cleanout hatch easily accessible for daily wash-out, emergencies.*
9. *Offset rotor is abrasive-resistant, replaceable. Blades, folds, kneads a homogeneous mix.*

LOW INITIAL INVESTMENT! Both Hi-Lo and Hi-Lo, Jr. are equipped with power take-off—use your truck engine and save the difference in price. Light weight too: saving gas, maintenance, repairs. Hi-Lo, Jr. operates on a single axle truck, saving even *more* money! Hi-Lo's are sold from factory to you—you get the distributor's share of the cost in the form of *extra* savings!

BETTER CONCRETE MEANS MORE BUSINESS FOR YOU! Hi-Lo has Visible Mixing Action! Perfect control over each batch, to give your customers *better* concrete *consistently*! Revolving blades give kneading, folding, blading action for homogeneous mix, preventing segregation. Open top saves time at the charging hopper. Discharge accurately controlled by the precision-manufactured sliding gate assembly.

MORE PROFIT ON SMALLER JOBS! You can work smaller jobs at a profit with Hi-Lo, Jr., saving gas, cleaning time, and wear on heavy duty trucks. Lighter, faster equipment saves time in transit and on the job. Hi-Lo comes in popular sizes, gives efficient, economical performance for years. Write *today!*

For your guarantee of highest quality,

DEMAND THE BADGE OF DEPENDABILITY!

2½ CUBIC YARD MIXER
3½ CUBIC YARD AGITATOR

Mail coupon today!

Member of Truck Mixer Manufacturers' Bureau

Made by the Makers of the new
ROCKET
REVOLVING DRUM TRUCK MIXER

Concrete Transport Mixer Co.

4987 Fyler Ave. · FLanders 7800 · St. Louis 9, Mo.

CONCRETE TRANSPORT MIXER CO.

Please rush prices and specifications on the famous Hi-Lo Truck Mixers, plus information on the following:

☐ NEW ROCKET REVOLVING DRUM TRUCK MIXERS ☐ BATCHING EQUIPMENT
☐ TRANSPORT TRUCK MIXERS ☐ WATER METERS

NAME_____

FIRM_____

ADDRESS_____

CITY_____ STATE_____

ONE BANTAM® FEEDS TWO 30-TON BATCHERS

Small pit averages 810 truck loads per week

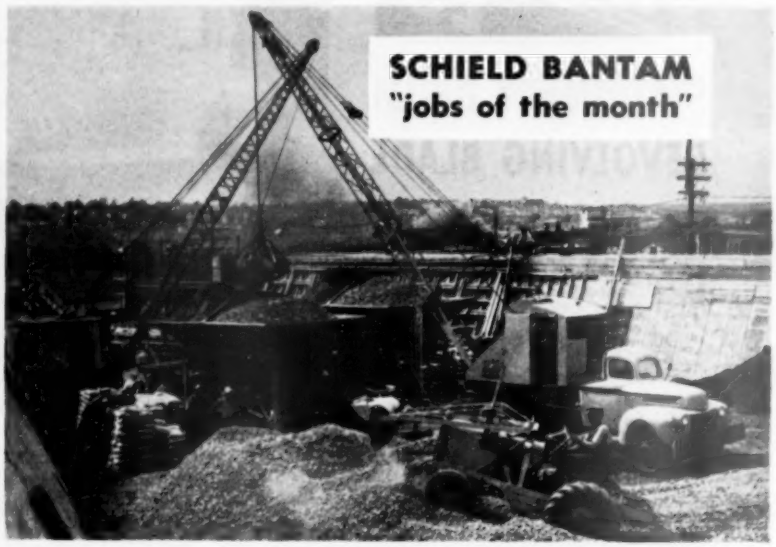
WAVERLY, OHIO — Working 24 hours a day, 5 days a week, one ⅜-yd. Bantam dragline, owned by A&W Gravel Co., has loaded out an average of 810 truck loads of gravel each week during the past *9 months.* Bantam keeps 7 big dump trucks rolling 'round the clock on 2-mile round trip haul between pit and new 12 x 24 rock crusher.

115 yds. in 1 hr.!

"In one instance", owner Charles Armstrong reports, "Bantam handled *42 truck loads in 2½ hours,* averaging 11 buckets per truck every 3 minutes — for an hourly average of approximately 115 cu. yds."

Armstrong says his *18-year-old brother* operates the machine and finds it "perfect" from the standpoint of speed, endurance and low maintenance. Repair costs to date have been confined to *one cable replacement,* even though this Bantam has worked the *equivalent of 27 months of normal dragline service.*

Smart Canadian contractor utilizes economical Bantam method to cut concrete costs on big bridge job



Truck-mounted Bantam clamshell with 35' boom delivers steady supply of sand and stone to 2 compartments in each batcher.

HALIFAX, NOVA SCOTIA — To speed construction of approaches for the new mile-long Halifax-Dartmouth bridge, being built across famous Halifax harbor, *McDonald Construction Co.* of this city is using two high-speed Schield Bantam truck cranes. One Bantam, equipped with clamshell (illustrated), is loading two 30-ton Lo-Bin batchers, which supply a pair of 16S concrete mixers, delivering a total of *30 cu. yds. of concrete per hour.* Job-mixed concrete is then poured directly into bridge forms by a larger ¾-yd. crane, thus providing a completely portable field set-up that is *fast, dependable and extremely economical to operate.*

Unloads materials

A *second* Bantam crane, brought in by McDonald, is unloading heavy granite facing stone from railroad cars to trucks. Same Bantam also hustles from one point to another, handling reinforcing steel, and performing numerous other crane jobs usually entrusted to larger, more expensive machines.

Cuts job costs

On this job—like thousands of others around the world — Bantam's 6-ton crane capacity, combined with its fast line speeds, maneuverability and low operating costs, are providing increased efficiency and economy, which can not be obtained by any other equipment method.

SB-E-2

BANTY SEZ:

"There's a place for a Bantam on every job . . . large or small"

Whether you are a small operator, or a big-time general contractor, there are dozens of applications where you can save time and money with a high-speed Bantam shovel-crane. New heavy-duty Bantam T-35 is *heavier, tougher* than its famous "M-49 brother" illustrated above . . . gives you 6-ton crane capacity, plus 8 fast-change attachments, for year-'round earnings. Write today for free demonstration and new descriptive Bantam literature.

SCHIELD BANTAM CO., 216 Park St., Waverly, Iowa

World's largest producer of truck-mounted cranes and excavators

New Bantam T-35 Crane sells for less than $6300.00

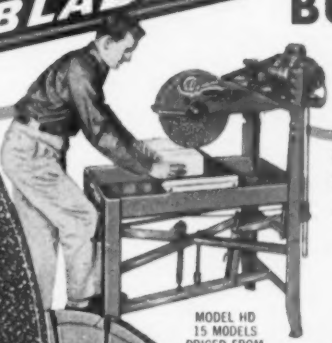
(plus truck and mounting charge)
F. O. B. Waverly, Iowa

Includes Basic machine, std. 25' boom, 12" block, 2 part line, and extra cwt. Dragline and Clamshell attachments for use with Bantam Crane available at slight extra cost. (Price subject to change).

LOOK JOE! Clipper® BLADES

HERE'S WHY... "4 OUT OF 5" BUY CLIPPER

- CUT FASTER
- LAST LONGER
- AT LOWER COST



MODEL HD
15 MODELS
PRICED FROM
$265

Clipper Superior Blades are guaranteed to . . . "Provide the Fastest Cut . . . at the Lowest Cost!"

MODEL C-130
ONE OF 5 MODELS
GAS OR ELECTRIC
POWERED

Clipper Superior Blades are manufactured under rigid control . . . assuring consistent quality. You are guaranteed peak performance . . . at the lowest possible cost with every blade.

CLIPPER BLADES to fit Every Make and Model Masonry—Concrete—Hand Power Saw

Your guarantee of the finest, fastest, most economical masonry and concrete cutting is the familiar Clipper Trade Mark on a Wet Abrasive — Dry Abrasive — "CBR" (Break-Resistant) — or a Diamond Blade.

ABRASIVES

Any masonry material can be cut in seconds with either a "WET" or "DRY" specification. New type Clipper Abrasive Blades approach the cutting speed of diamonds.

DIAMOND

No other means of masonry or concrete cutting can equal the cutting speed of a Clipper Diamond Blade. Only Clipper has every necessary specification to do your cutting job.

"CBR" Break-Resistant

Drop—Bend—Twist . . . they're virtually unbreakable! 50% to 100% longer blade life on softer ranges of materials. Ideal for both masonry and hand power saws.

Today! **. . . try the NEW—Faster Cutting—Economical CLIPPER SUPERIOR BLADES**

Why guess about performance? Why experiment? Why take a needless loss? At our 24 locations you will find a Clipper Specialist who can tell you exactly which Clipper blade will give you the fastest cut at the lowest cost on your materials.

Nearly 20 Years Experience Behind *Genuine* CLIPPER PRODUCTS

The unqualified Clipper guarantee of satisfaction is backed by nearly 20 years of world-wide experience, the ability to select the finest materials and the "know-how" to put them together.

TRY A Clipper® MASONRY SAW OR CONSAW ON FREE TRIAL

Clipper®

KANSAS CITY 8, MISSOURI

COAST TO COAST

- PHILADELPHIA
- ST. LOUIS
- CLEVELAND
- DETROIT
- AUSTIN, TEX.
- CHICAGO
- LOS ANGELES
- BOSTON
- HOUSTON
- MILWAUKEE
- ST. PAUL
- INDIANAPOLIS
- NEW YORK
- PITTSBURGH
- SAN FRANCISCO
- CINCINNATI
- ATLANTA
- WASHINGTON, D.C.
- BIRMINGHAM
- CHARLOTTE, N.C.
- DALLAS
- KANSAS CITY

IN CANADA — P.O. BOX 476, WINDSOR, ONTARIO

MAIL COUPON NOW

SOLD ONLY DIRECT FROM FACTORY BRANCHES

CLIPPER MANUFACTURING CO.
2807 E. WARWICK • KANSAS CITY 8, MO.

Send FREE Literature and Prices on:

- ☐ CLIPPER ABRASIVE BLADES ☐ WET ☐ DRY
- ☐ CLIPPER "CBR" (Break-Resistant) BLADES
- ☐ CLIPPER DIAMOND BLADES—MASONRY
- ☐ CLIPPER DIAMOND BLADES—CONCRETE

No 100

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

One Good SMITH-MOBILE Deserves Another
38 truck-mixers operating out of this large Western ready-mix plant . . . and every unit is a SMITH-MOBILE.

You'll Find it Pays to STAY with SMITH!

Owners of Smith-Mobile Truck Mixers invariably come back for more Smith-Mobiles. Why? Because they are thoroughly satisfied with the performance of their machines. They KNOW from their own practical experience that Smith-Mobiles have longer life, lower maintenance costs and LESS DOWN TIME . . . that Smith-Mobiles are designed to DELIVER MORE YARDS PER YEAR . . . give you MORE "TAKE HOME" DOLLARS. Beyond this, they know that Smith-Mobiles are backed by the world's leading concrete mixer manufacturer. So it's no wonder you see so many fleets of Smith-Mobiles in every section of the country. Once a Smith-Mobile owner . . . always a Smith-Mobile owner. You'll find it pays to stay with Smith.

THE T. L. SMITH COMPANY
2885 North 32nd Street • Milwaukee 45, Wisconsin, U. S. A.
Affiliated with ESSICK MANUFACTURING CO., Los Angeles, Calif.

SMITH
THE T. L. SMITH CO. MILWAUKEE U.S.A.

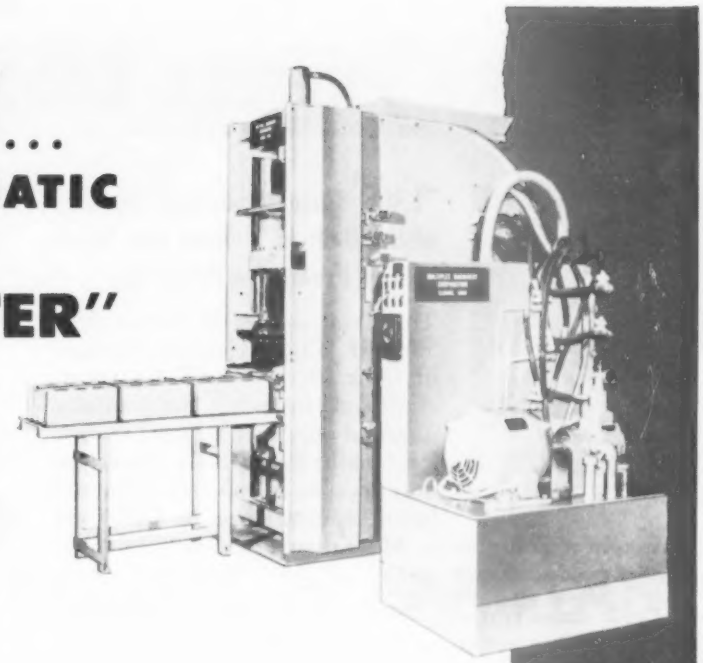
CONCRETE MIXERS

For BIGGER and BETTER Concrete Mixers and Truck Mixers . . . LOOK TO SMITH

A 7469

For fast production of low-cost quality block . . .

BUY AN AUTOMATIC MULTICO "BLOCKMASTER"

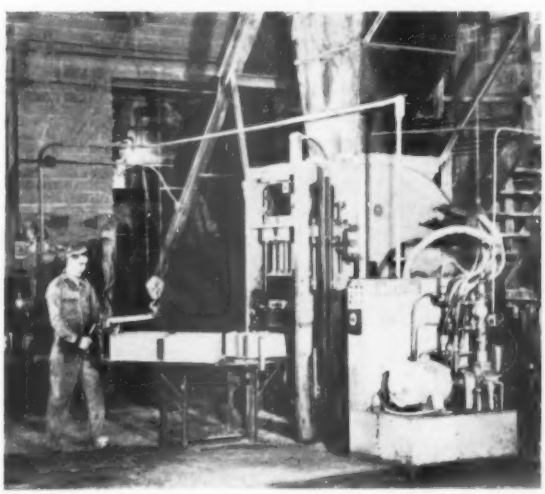


Multico BLOCKMASTER installations will pay for themselves in an average of 18 months. These durable, dependable block machines make even a small plant competitive because they mass produce all sizes and shapes of low-cost quality block. All operations except off-bearing are fully automatic and are variable to meet production needs. Install a Multico BLOCKMASTER and eliminate production bottlenecks in peak seasons.

Multico field engineers will be glad to discuss your problems and to make recommendations without obligation. Over 45 years of on-the-job experience in the industry assure you of top quality equipment and service.

Check these Features!

- LOW INITIAL COST
- MINIMUM MAINTENANCE
- FULLY AUTOMATIC
- MAKES ALL SIZES AND SHAPES
- HANDLES ANY AGGREGATE
- TAMPS UNDER POWER VIBRATION
- PERMITS QUICK MOLD BOX CHANGES
- SMOOTH, POWERFUL HYDRAULIC OPERATION
- SEPARATE POWER AND CONTROL UNIT
- AVAILABLE IN 2 and 3-BLOCK MODELS



WRITE FOR BULLETIN FOR ADDITIONAL DETAILS.

Another Profitable "Blockmaster" Plant

This Model 2 machine is operating at 3½ to 4½ cycles per minute at the LORAIN CRYSTAL ICE COMPANY, Lorain, Ohio. John P. Kocak, Manager, reports, "The Multico machine makes good block on a production basis. It has been a profitable investment and has kept us competitive in price and quality."

126h-MM

MULTIPLEX MACHINERY CO.
DIVISION OF MULTIPACK, INC.
101 FREMONT STREET ELMORE, OHIO

MANUFACTURERS OF BLOCK MACHINES • MIXERS • SKIP HOISTS • STRIPPERS • ELEVATORS

*Another Leader** IN THE PRODUCTS INDUSTRY PREFERS BESSER VIBRAPACS!

VIRGIL E. COOK, President and General Manager of the Cook Block and Brick Co., Anderson, Ind.

"I Use Besser Equipment because of the Built-in Stamina that Gives Top Production Every Day"

This frank statement comes from Virgil E. Cook, General Manager of Cook Block & Brick Company, Anderson, Indiana. The company installed their first Besser Vibrapac machine in 1946. Today they produce 66 sizes of concrete block and brick, specializing in Celocrete lightweight masonry units. More than a million 8" modular units are produced each year.

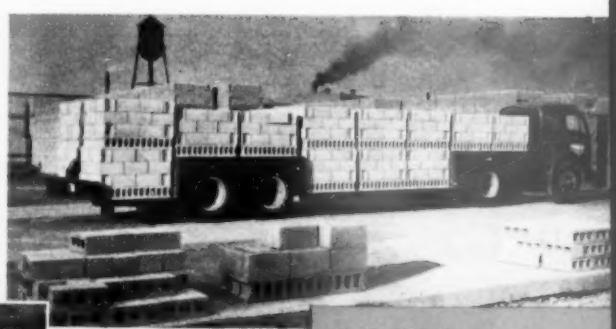
Mr. Cook states further: "When I installed my Vibrapac, I was relatively a newcomer in the business. So I did enough research to learn that the majority of the leaders in the industry were using Vibrapacs. I concluded that all of these successful business men could not be wrong".

If you intend to erect a new concrete products plant . . . or expand your present plant . . . consult a Besser engineer. He will gladly give you the benefit of his broad experience in this specialized field.

BESSER MANUFACTURING CO., Alpena, Michigan, U. S. A.

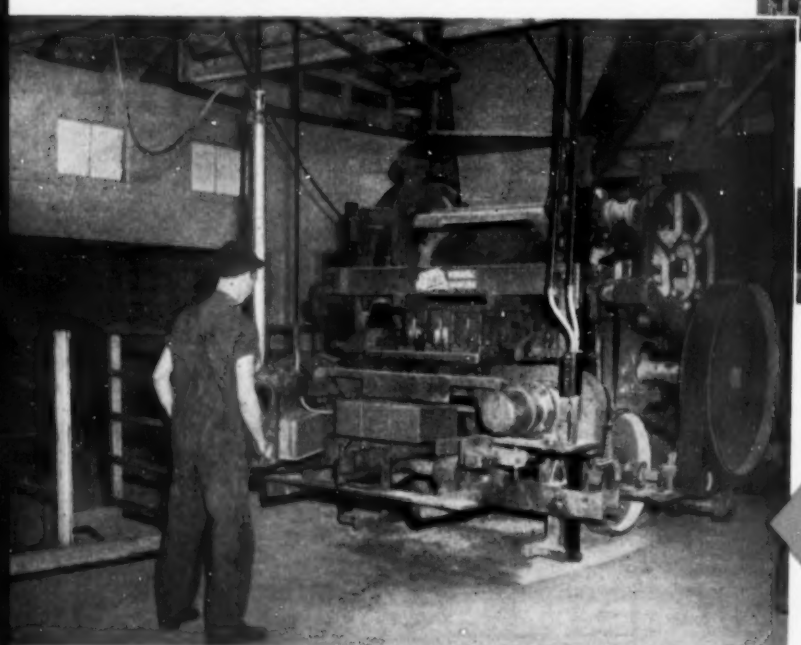
Complete Equipment for Concrete Products Plants

Note the unique construction of the Cook delivery trucks. Wheelbase is extended to accommodate four cubes of blocks. When hauling lightweight units, cubes can be "double-decked", thereby increasing capacity to 720 eight-inch block.



New tractor-trailer used for long hauls. Trailer was designed and built by Cook. Handles 24—60 block cubes of lightweight units.

Exterior view of the Cook plant. Equipped with all modern facilities, including steam curing, which accelerates the curing process.



★ This is the 98th of a series of ads featuring leaders of the industry who are stepping up block production with Vibrapacs.

The heart of the Cook plant is the Besser Super Vibrapac — the modern, fully automatic concrete block machine. It produces three 8" x 8" x 16" modular units at a time on one plain pallet. Other sizes produced in equivalent multiples on the same set of plain pallets. No machine operator is required. Hand labor is reduced to pushing a switch button and guiding a power off-bearing hoist.

A-7290-1PBC

BESSER

BATCH MIXERS | SKIP LOADERS | BLOCK & BRICK CUBERS | SUPER VIBRAPAC | SINTERING PLANTS | ACROW CENTERS | ROOF TILE MACHINE

Rocla Pipes, Ltd., Melbourne, Australia, has contract to set up plants and supply machinery and technical supervision for the manufacture of prestressed, reinforced concrete pressure water pipe for Pakistan, using roller suspension pipe machines

By F. L. FITZPATRICK*

Prestressed, rubber-jointed 51-in. concrete pipe installed in twin sewerage force main at Brisbane, Australia

PRESSURE PIPE PROJECT IN PAKISTAN

THE GOVERNMENT OF PAKISTAN has entered into a contract with Rocla Pipes Ltd., Melbourne, Australia, for the manufacture in Pakistan of prestressed reinforced concrete pipe as follows:

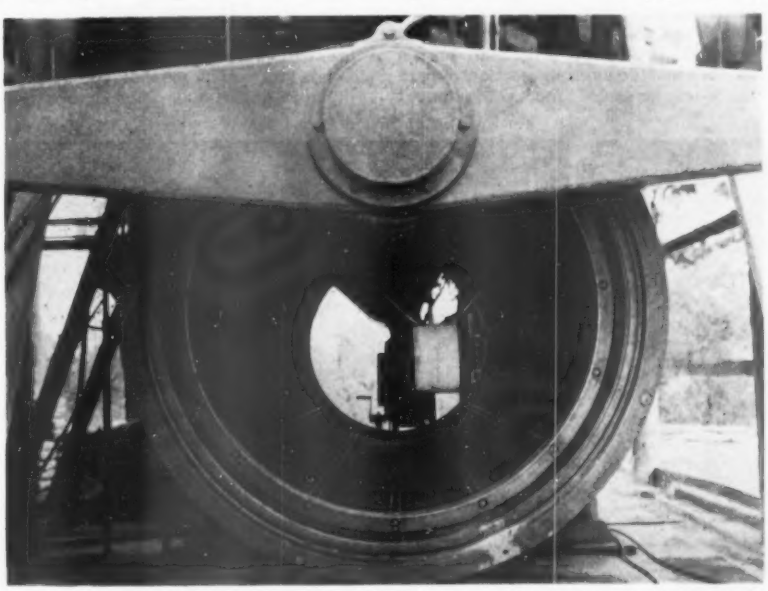
Length	Diameter	Test Head
35,000 ft.	102 in.	200 ft.
47,000 ft.	60 in. to 72 in.	400 ft.
204,000 ft.	36 in. to 54 in.	400 ft.
370,000 ft.	24 in. to 33 in.	400 ft.
1,350,000 ft.	12 in. to 21 in.	400 ft.

Before making this contract, the Pakistan Government engineers investigated several alternative processes offered, including those of European firms.

Special equipment and machinery necessary is being manufactured in Australia and shipped to Pakistan. The principal plant elements are: eight batching plants, 10 Rocla roller-suspension pipe machines, 10 prestressing machines, and five mortar-coating machines.

The plant will be set up in Pakistan, and operated in the early stages under the supervision of experts sent from Australia. Subsequently, it will be worked by a team of Pakistan operatives, under the control of Pakistan engineers, who will use Rocla Pipes Ltd. as consulting engineers for the work.

Pipes will be manufactured in 16-ft. lengths, with Rocla rubber-ring type, flexible bell-and-spigot joint. No steel cylinder or membrane will be used, as the concrete produced by the roller-suspension process is quite watertight even at pressures of 200 p.s.i. and higher, and no metal ends are needed at the joints. The process will be generally similar to that in use on a current job of this company at Brisbane, Australia where a contract of 42,000 lin. ft. of 51-in. pressure pipe has almost been completed.



A 51-in. diameter pipe mold in position on roller-suspension machine; pretensioned longitudinals in position and mechanical charging machine ready to place concrete

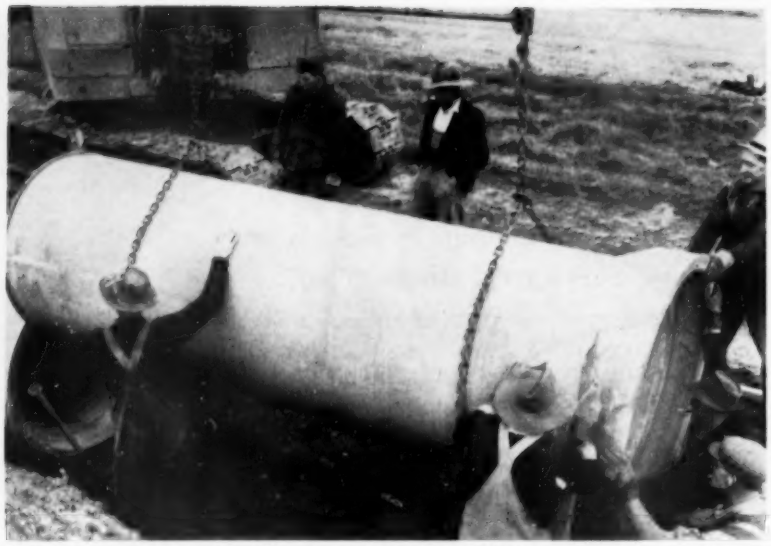
Processing Method

The prestressed pipe comprises a bell-and-spigot concrete body (produced by the Rocla patented roller suspension machine), around which high tensile wire is wrapped, followed by a mortar coat to protect the prestressed wire winding. The design provides, after due allowance for loss of prestress by shrinkage and creep, that the concrete will never sustain tension stresses when in service.

Concrete used for the manufacture of the pipe is a well-graded mix (maximum particle size ¾ in.) containing 25 percent portland cement. The water-cement ratio used is around 0.27, and this extremely dry concrete works up under the rolling process to a very dense concrete with a good finish. The longitudinal wires are first pretensioned, and secured to the mold ends, and the mold is then caused to rotate on the supporting roller, while the concrete is introduced by a conveyor-belt type charger. Two operators take care of all work (mixing and filling) of pipe manufacture, the time involved for one pipe, 60-in. diameter by 16 ft. long, being approximately 30 min.

After the rolling operation has been completed, pipe remain in the

*General manager, Rocla Pipes Ltd., Melbourne, Australia



A 48-in. diameter pipe with rubber ring joint being installed in sewerage force main near Melbourne, Australia. Joint is made by simply forcing the spigot of the pipe into the bell of pipe previously laid

molds for 24 hr. and are then removed. The mere operation of lifting the pipe clear of the mold involves a tensile stress (modulus of rupture) of approximately 300 p.s.i. in the concrete when it is only 24 hours old. So effective is the consolidation of the "dry" concrete mix that the surface of the compacted concrete is not marked by men walking through the pipe immediately after rolling has ceased.

Within 48 hr. the concrete has the specified minimum compressive strength (3000 p.s.i.) at which wire winding may safely be applied. Tests on the concrete yield actual compressive strengths of 9,000-10,000 p.s.i. at 28 days.

High Tension Wire Winding

The tensioned wire winding is carried out by one operator who does all operations in this phase. For this operation, the 5-ton pipe is placed in a lathe-type machine which rotates the pipe slowly. The end of the wire to be wound is secured to an anchorage provided on the pipe. As the machine rotates, the high tensile wire (U.T.S. 225,000 p.s.i.) is drawn from a spool, through a simple roller device which produces a tension in the wire of 140,000 p.s.i., and is wrapped around the pipe in an even spiral. The tensioning roller device is traversed along the pipe during winding so as to produce the required spiral pitch of wire, and the wire is finally anchored off when winding has been completed and the end of the pipe is reached. The wired pipe then passes to the mortar-coating section where a ⅝-in. layer of mortar is pneumatically applied over the whole external surface. Branch pipe are produced by casting into the pipe barrel during the manufacture of the latter, a steel base section or insert, to which the branch (steel) is subsequently welded. Protective concrete is then placed over the steel branch and junction, and a cement lining is applied to the branch pipe. The tensioned wires intercepted by the branch are attached, without loss of tension, to the steel insert.

Where reinforced pipe (not prestressed) is required, the reinforcing cages are produced upon a machine which draws wire from a spool, winds the wire into the spiral form and pitch required, welds it successively at each intersection with a longitudinal wire, and continuously ejects the finished cage to any required length. Finished cages are strong and accurate, and a minimum of labor is involved in their production.

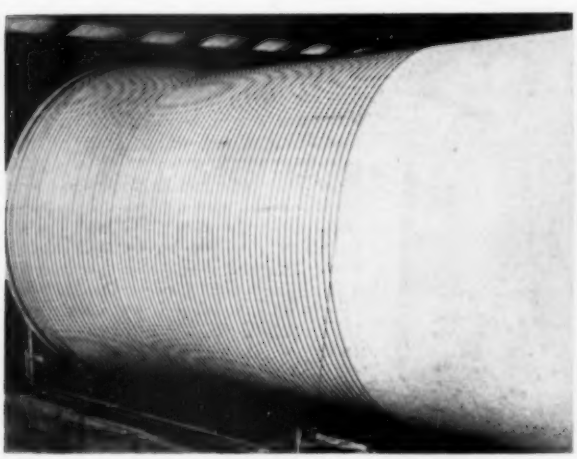
Because of the density of the concrete, coupled with the effect of the tensioned wire wrapping, the 51-in. pipe (2½-in. wall plus ⅝-in. gunite coating) remain entirely tight under a test pressure of 250 p.s.i. The rubber-ring joints afford a high degree of flexibility and permit a safe deflection per joint of one degree. Each pipe is tested hydrostatically before delivery, and the test performance is consistently excellent, leakage under test being almost unknown with this class of pipe.

Details of the 51-in. prestressed concrete pipe made under the Brisbane contract are:

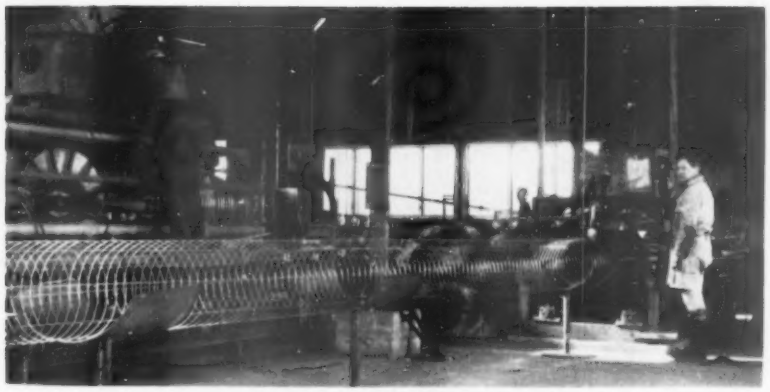
Inside Dia. In.	Test Pressure p.s.i.	Barrel Thickness In.	Mortar Coat	Total In. Wall Thickness	Tensioned Wire area per lin. ft.
51	65	2½	⅝	3⅛	0.18 s.i.
51	250	2½	⅝	3⅛	0.70 s.i.

Pakistan Plant

The plant to be installed in Pakistan will have an output capacity per 8 hr. shift of some 300-400 tons of pipe. It will handle, for a start, the



Left: A 51-in. pipe being wound with high tensile wire under a tension of 140,000 p.s.i. Right: Applying ⅝-in. mortar coating over pretensioned wires. Pipe length is 16 ft. (The twirling design shown in the illustrations of the reinforcing is an engraver's optical illusion)



Continuous-type reinforcement cage welding machine. In background, mandrel type cage machine for electrically welding very large diameter cages

pipe for augmentation of the water supply of the city of Karachi. This city, having multipled its population more than three times since 1939, requires a greatly increased supply of water, which has to be brought from the Indus River. This mighty river and its tributaries are also to supply water for extensive irrigation projects planned for West Pakistan. These projects have as their aim the irrigation of a further 12,000,000 acres of land. The large concrete pipe plant, now in course of preparation and installation, will therefore have an extensive field of usefulness for many years to come. The Australian government is participating in financing the pipe manufacturing equipment, as part of its contribution to the Colombo Plan for assistance by the western nations towards the development of Asiatic countries.

A.C.I. Awards

THE ANNUAL A.C.I. AWARDS were presented by A. T. Goldbeck, president, at the 49th annual convention of the American Concrete Institute, held recently in Boston, Mass.

Franklin R. McMillan, consulting engineer and past-president of A.C.I., Asheville, N.C., was chosen for the Alfred E. Lindau award, in recognition of his contributions to reinforced concrete design practice. The award was founded in 1947 by the Concrete Reinforcing Steel Institute in honor of the late Alfred E. Lindau, past-president of A.C.I.

F. Thomas Collins, consulting engineer, San Gabriel, Calif., received the American Concrete Institute Construction Practice Award for his paper, "Tilt-Up Construction in Western United States," which was published in the October, 1951, *ACI Journal*. This award was established by A.C.I. in 1944, to recognize the "man-on-the-job" for his resourcefulness in translating design into the completed structure.

Charles H. Scholer and Gerald Smith, professor and head of Department of Applied Mechanics, and assistant professor of applied mechanics, respectively, Kansas State College, received the Wason medal for "noteworthy research" reported in "Use of Chicago Fly Ash in Reducing Cement-Aggregate Reaction," in the February, 1952, *ACI Journal*.

Charles S. Whitney and Boyd G. Anderson, partner and chief designing engineer, respectively, Ammann and Whitney, New York, N.Y., and Milwaukee, Wis., and Mario G. Salvadori, consultant to Ammann and Whitney and professor of civil engineering, Columbia University, were recipients of the Wason medal for the "most meritorious paper" of the year, "Comprehensive Numerical Method for the Analysis of Earthquake Resistant Structures," published in the September, 1951, *ACI Journal*. The Wason awards were established in 1917 by the late Leonard C. Wason, past-president of A.C.I.

•

FORT DODGE CONCRETE CO., Fort Dodge, Iowa, was recently sold by Robert J. Fisher former owner and president. Mr. Fisher has purchased an interest in Des Moines Concrete Products Co., Des Moines, Iowa.

Association President

BENJAMIN WILK, president of Standard Building Products Co., Detroit, Mich., has been elected president of the Concrete Products Association of Michigan. Richard Parisian of the Standard Block and Supply Co., Lansing, was named vice-president; H. J. Vincent of Cinder Block, Inc., Detroit, is secretary, and R. A. Berger of the Martin Berger Cement Block Co., Detroit, is treasurer. On the executive committee are: G. A. Mansfield, Fraser; M. J. Mendelson, Friendship Block and Brick Co., Detroit; Knut Skeie, Tiger Cement Products Co., Detroit; Ivan N. Bernson, Western Concrete Products Co., Cadillac; Forrest S. Pearson, Crandall's Concrete Products, Inc., Benton Harbor; and Roy Winters, Muskegon Heights.

Heads N.C.M.A. Committee

R. NEIL CHRISTY, vice-president of engineering, Marietta Concrete Corp., Marietta, Ohio, has been named chairman of the technical problems committee of the National Concrete Masonry Association. New members of the committee are Louis Freedman, Massachusetts Cement Block Co., Boston, Mass., John D. Daly, Auburn Cement Products Co., Inc., Auburn, N.Y., and Jay C. Ehle, Cleveland Builders Supply Co., Cleveland, Ohio. They succeed Alfred Paolella, R. A. Utiger and Paul M. Woodworth.

Sales Engineer

ROBERT M. O'SHEA has been appointed sales engineer for the National Cement Products Co., Toledo, Ohio. He was formerly a structural engineer for Bellman, Gillett & Richards, architects and engineers. In his new position, Mr. O'Shea will handle the sales and engineering for the F & A precast concrete floor system. He succeeds Warren R. Fellabaum, who will devote his full time to building materials.

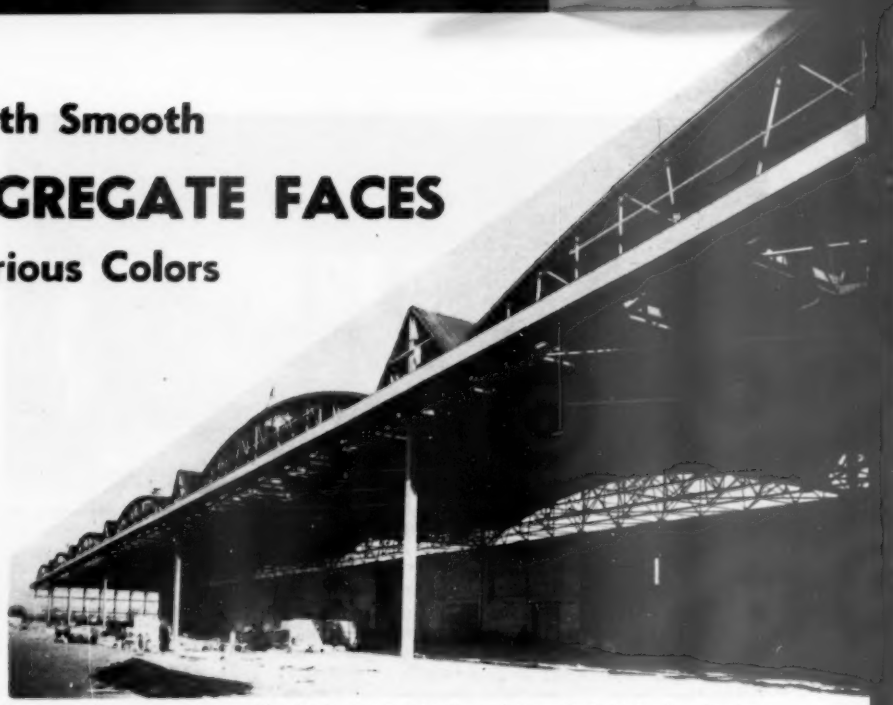
Board of Governors, Concrete Pipe Associations, Inc. Left to right, standing: Ray A. Foley, W. B. Freeman, and A. W. G. Clark. Seated, left to right: H. S. Price, Jr., Ivy H. Smith, and G. D. Williamson

Producing Block With Smooth

MARBLE AGGREGATE FACES

In Various Colors

Marble Face Blocks, Inc., manufacture concrete block in attractive colors and surface texture by adaptation to conventional equipment and methods. Schools, churches, apartments, residences, airports, railroads, and industrial structures use large volume of units



Hangar under construction at Idlewild Airport by the Port of New York Authority, showing wall 850 ft. long erected with 80,000 sq. ft. of grey and tan marble-face block

SURFACE TEXTURE AND COLOR in concrete products are being given increasing emphasis by manufacturers to give the architects building units which fit into the modern concept of construction. This is evident not only in residential building but also in many large industrial structures.

Marble Face Blocks, Inc., with offices in New York City and a plant at Kenilworth, N.J., is producing a marble-face concrete block which is gaining wide acceptance as it offers many interesting color combinations and an attractive surface texture. The process applies basic principles with which all block manufacturers are familiar and consists of a relatively simple and economical extension of the normal production cycle. Basically, it involves the application of a prepared marble-aggregate concrete face to one or both sides of a conventional concrete masonry block during the normal cycle of operation. The resulting integral concrete marble-face block has a smooth, shiny surface which does not have a flat, uniform color but gives the warmer and richer effect of natural stone, the color shading and texture of which adds depth and interest to a wall.

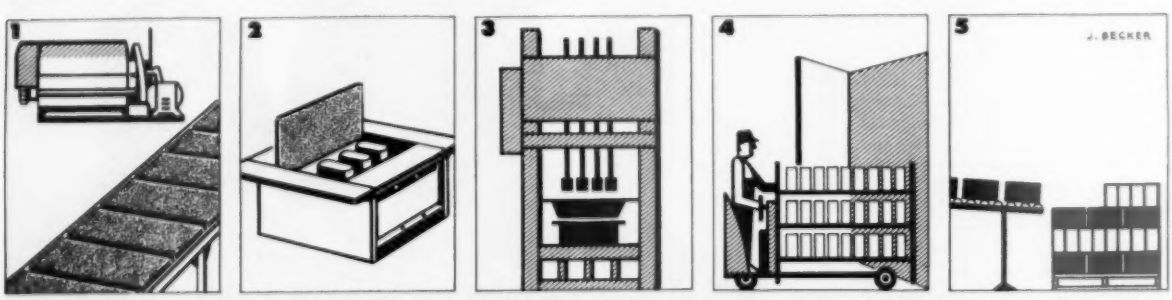
Manufacturing Steps

There are five basic steps in its manufacture. The first step is the controlled mixing in a paddle-type mixer of carefully graded marble aggregates with formulated amounts of pure mineral oxide pigments, white cement and water to produce the desired color. This mix is then vibrated in stainless steel pans each of which is of the size and shape of the desired face for both regular and corner block. Pans are thoroughly cleaned before using and then given a wax coating. Length of time and amplitude of vibration tables are controlled to obtain a smooth, dense, air-free concrete mix in the pans which move down a roller conveyor and are then loaded into racks which, under present manufacturing methods, are transported to the block machine by lift trucks.

The second step is the insertion of the pan (or in the case of double-faced block, two pans) into the mold of a conventional tamp-type concrete block machine which has been adapted for this purpose.

While the pan or pans are in the mold box, the third step consists of feeding the basic block mix, which may be sand and gravel or lightweight aggregate concrete, into the mold box and making the block against the face or faces of the marble-aggregate mix which is of a plastic consistency that facilitates complete integration in the block. After the block is struck off in the conventional manner, it is stripped from the mold and placed on the block rack with the pans still covering the faces.

The fourth step follows the usual procedure of transferring the racks to the kilns for curing. After curing by conventional methods at approximately 170 deg. F. for three hours to equilibrium with a total of 14 hours in the kiln, the last step is to remove the racks of cured block to the stripping area where the pans are stripped from the faces. The completed marble-face block are cubed face-to-face on



Five basic steps in the production of marble-face block: (1) mix of marble aggregate, white cement and mineral pigment fed into stainless steel pans is vibrated to a dense consistency; (2) pan containing wet face mix is inserted into the mold box of the block machine; (3) regular concrete mix is fed into the mold box of block machine and block is manufactured against exposed marble aggregate face forming an integral concrete unit when stripped from the machine; (4) block with pans still covering the faces are transported in racks to the kilns for conventional curing; (5) pans are stripped from the cured block and the marble-face block are cubed on wooden pallets

Left: Tamper block machines making marble-face block. Right: Stripping pans from cured block and cubing in preparation for shipment

wooden pallets. When the blocks are shipped the entire cube is banded to the wooden pallet to prevent damage in shipment. Steam for curing is supplied by a Shore Engineering Co. steam generator unit. All block are dated to assure adequate curing time before shipping.

Block meet all federal, state and local building code requirements, conform to A.S.T.M. specifications, and are approved by the New York City Board of Standards and Appeals. C. B. Locklin, vice-president in charge of production and development, Marble Face Blocks, Inc., called attention to the fact that the dense concrete mix of the face adds considerably to the overall strength of the unit and lowers the moisture absorption percentage. Tests conducted by independent laboratories demonstrated that even under the severest conditions, the facing will not separate from the block or crack before the block breaks. Since the block are precision cast and the bonding of the face to the rest of the block material is done simultaneously, each unit has square corners with the faces truly parallel and correct arrises that assure precision alignment.

The marble-face block is not a new, untried unit. A description of the block appeared in ROCK PRODUCTS, June, 1949, page 176. Albert Knighton, inventor of the patented process and one of the directors of Marble Face Blocks, Inc., spent a number of years in basic research and field tests before the unit was announced. The plant at Kenilworth originated as an experimental operation to perfect the production technique, and to prepare for the gradual dissemination of the patented process throughout the United States. For this reason, the plant is now run with little diversification as a pilot operation manufacturing exclusively marble-face block in a full range of customary block sizes and types, with single or double faces in a variety of standard colors as well as special colors to meet customer's specifications.

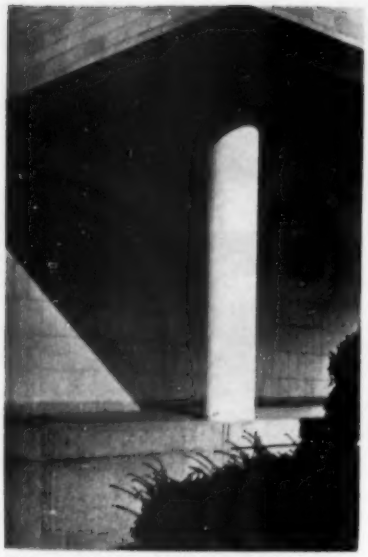
Mr. Locklin, formerly manager of concrete products plants for the Frederick V. Lawrence enterprises in New England, pointed out that established block producers could benefit from manufacturing marble-faced block as a part of a diversification program along with their normal output of ordinary block. Additional equipment for economical production would vary according to existing facilities, but due to the simplicity of the process, the necessary investment would be comparatively moderate.

Outstanding Installations

Some idea of the diversity of building types and uses for marble-face block can be obtained from a list of over 200 installations, ranging in size from small residences to entire churches. Among these installations are 40 stores, 45 industrial structures, 12 office and apartment buildings, 10 schools, 25 railroad installations, and two outstanding airport structures for the Port of New York Authority. Nearly 80,000 sq. ft. of marble face block were used at Idlewild, N.Y., International Airport, and about 40,000 sq. ft. of interior hallways at the Newark, N.J., airport. In addition, the port of New York Authority is using double-faced, two-color, 8-in. marble-face block for the passenger arcades which lead from the Newark Terminal building to the flight lines, each wall being erected with two completely finished surfaces, a gray exterior and a tan interior in one masonry operation. Such large industrial organizations as Arma Corporation, Aluminum Company of America, Bendix Aviation and Squibbs have used marble-face block in recently built structures. These firms used the block for a diversity of purposes, ranging from stair-wells, and corridors to lavatories, garages, and meat-packing plant walls. The New York Central Railroad has used the block in 25 building projects; the Johnson and Johnson plant in New Jersey, the University of Pennsylvania and the archdiocese of New York also are among the notable users.

Inserting pan with prepared concrete face mix into mold box

Vibrating concrete face mix in stainless steel pans



White marble-face block used in this modern entrance arcade of the Johnson & Johnson plant at Metuchen, N.J. Designed by Fedheimer & Wagner

Officials of Marble Face Blocks, Inc., estimate that savings ranging from 30 to 50 percent may result from the use of marble-face block construction as compared with other materials computed on the customary basis of installation costs per square foot.

In view of the ready acceptance of the marble-face block in the conservative New York market area, the company is now planning to offer a limited number of exclusive franchises to block manufacturers with a proven record of success in other markets. In addition to technical assistance in the installation of the marble-face block production methods, Marble Face Blocks, Inc., will assist in training salesmen with methods that have been found successful in dealing with the New York marketing area.

Officers of the company in addition to Mr. Locklin are: William Naumburg, Jr., chairman of the board; Fred R. Driessen, president; and Frank J. Lowell, vice-president in charge of sales.

Concrete Products in Washington State

C. M. HOWARD, manager, Concrete Products Association of Washington, recently reported that both the tonnage and dollar value of precast concrete used in the State of Washington in 1952 exceeded the use in any previous year by large volumes. He stated that not only did the 28 member companies of the association have a busy year, but that several non-association companies are furnishing large quantities of precast concrete products on major construction projects. The association office has been called upon to assist with specifications and construction details on many of these major projects which call for large amounts of concrete pipe, concrete masonry and precast structural members.

Concrete pipe is being used in large quantities in the construction of sanitary and storm sewers, culverts and drains in state, county and city highway construction, irrigation works and municipal water supply lines. One of the major 1952 construction projects in the state using concrete pipe was the sanitary and storm sewer project for the new South Fort Lewis regimental area. More than four miles of reinforced concrete pipe for storm sewers and over six miles of unreinforced concrete pipe for sanitary sewers were used. The storm sewer construction used sizes from 12 in. to 72 in. dia., nearly half of it being 72 in. dia.

Among major construction projects utilizing outstandingly large amounts of concrete masonry were the Fort Lewis and Auburn depot projects.

Ohio Block Association

THE OHIO CONCRETE BLOCK ASSOCIATION held an organizational meeting at Columbus, Ohio, March 19, 1953. Representatives of 25 block companies were in attendance.

R. E. Francis, president, Reading Concrete Products, Inc., Cincinnati, was elected the first president of the association. Other officers are Harrie P. Clegg, Jr., president, The Crume Brick Co., Dayton, first vice-president; William A. Rodgers, division manager, Basic Construction Materials, Chillicothe, second vice-president; John F. Royer, seretary, Columbus Concrete Block Association, secretary; and Samson I. Crew, vice-president and treasurer, Crew Builders Supply Co., Cincinnati, treasurer.

Trustees elected include O. H. Seeger, Harry Wellnitz Co., Columbus, and also immediate past-president of the Columbus Concrete Block Association; Dan G. Newton, Concrete Masonry Units, Hamilton; V. J. McDevitt, The Akron Brick & Block Co., Mogadore; H. J. Schmitz, Cement Products, Inc., Mansfield; Robert W. Geist, Geist Block & Supply Co., Piqua; E. E. Osborn, The Clinton Construction Co., Wilmington; William H. Ebling, Lima Cement Products, Inc., Lima; and Frank D. Snyder, Snyder's Milling Service, Marengo.

Office of the new association is at 50 E. Broad St., Columbus 15, Ohio.

Acid Resisting Concrete

WHEN CONCRETE is treated with silicon tetrafluoride, the surface becomes greatly hardened and very resistant to acids. The compressive and flexural strengths are greatly improved. The operation can best be done in a pressure chamber from which the air is first exhausted. These results were reported in the July, 1952, issue of *Zement-Kalk-Gips*, p. 203, by Dr. W. Wittekindt, and were obtained in the Dykerhoff cement laboratory. Favorable results were obtained after exposing to sodium sulfate solution and to solutions of acetic/lactic and hydrochloric acids.

Sales Manager

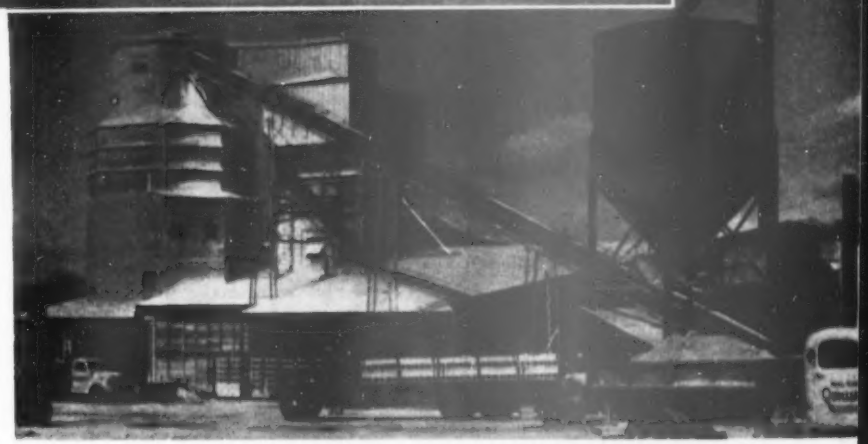
W. S. BELOU has been appointed sales manager for Louisiana Concrete Products Co., Baton Rouge, La. An engineering graduate of Louisiana State University, Mr. Belou was formerly with United States Gypsum Co. in industrial sales for Louisiana and Mississippi.

Attending the organizational meeting of the Ohio Concrete Block Association were, left to right, seated: Frank D. Snyder, Marengo; B. A. Wettig, Dayton; C. L. Wiles, Columbus; George B. Eichenlaub, Columbus; Samson I. Crew, Cincinnati; Harrie P. Clegg, Jr., Dayton; O. H. Seeger, Columbus; W. C. Lewis, Dayton; Sam C. Davis, Dayton; and Louis Stuber, Mogadore. Standing: H. J. Schmitz, Mansfield; James E. Callihan, Chillicothe; Vic Scott, Dayton; J. E. Crissman, Columbus; R. E. Francis, Cincinnati; Dan G. Newton, Hamilton; V. J. McDevitt, Mogadore; E. E. Osborn, Wilmington; J. Paul Patterson, Columbus; Peter J. Minck, Columbus; Frederick R. Lang, Columbus; William H. Ebling, Lima; William A. Rodgers, Chillicothe; Robert W. Geist, Piqua; John F. Royer, secretary, Columbus; and Harold G. Edwards, attorney, Columbus

Curing System For Quality Block

Quillian's Concrete Co., Daytona Beach, Fla., producer of ready-mixed concrete, constructs concrete block plant which is producing units that have less than 20 percent moisture absorption

By LOWELL ROBERTS



View of ready-mixed concrete and block plants. Batching unit is to the left

HUGO QUILLIAN, a partner with his father in the operation of Quillian's Concrete Co., Daytona Beach, Fla., realized that it would be necessary to build a block plant to produce exceptionally high quality block at a low cost and in large volume to overcome serious obstacles facing concrete masonry that had developed in the area. A graduate civil engineer from Georgia Tech with 3½ years service as a construction officer in the Seabees during the war, he set out to do the job methodically using the latest technical developments. He has been associated with his father since the end of the war operating a ready-mixed concrete plant with 14 large mixer trucks.

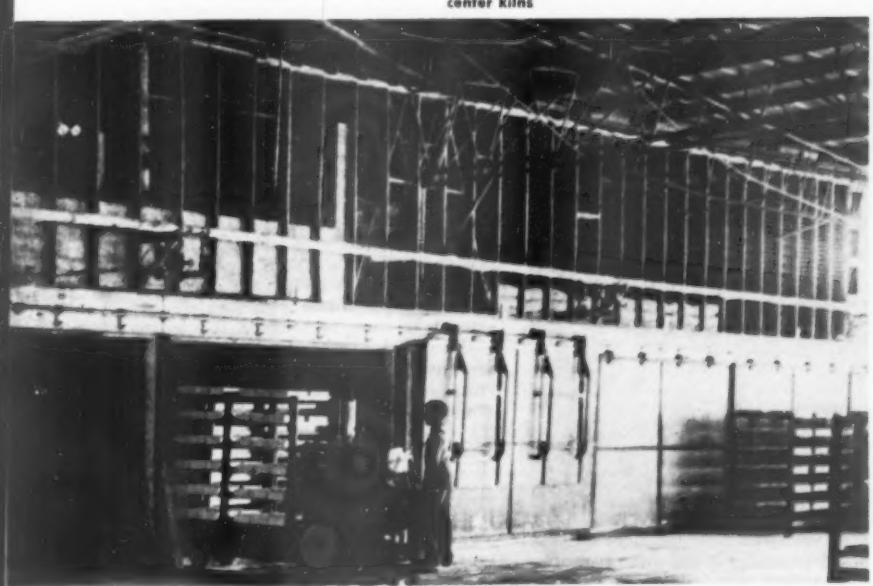
J. W. Quillian started in the construction business in the South when he was 16 years of age. He operated a block plant at the present location from 1926 through 1942, at which time the plant was closed because it had become obsolete. The ready-mixed concrete business along with some contracting kept them busy until the present venture was undertaken in 1951.

Due to some of the poor performance records of concrete masonry units in the area over a period of years, frame and clay tile construction was favored by architects, engineers and builders. Fully aware of the problems facing them, Quillian's set out to build a completely new and modern block plant on their property adjacent to the ready-mixed concrete plant in the Holly Hill section of Daytona Beach. Prior to making this decision, considerable time was spent in studying the various methods, machines and systems for block production. These studies took them on extensive trips to various parts of the country to observe and investigate methods and practices used by other plants.

The difficulty with the concrete units that had caused the bad reputation in the area was apparently due to poor curing methods with a lack of uniformity in strengths and moisture content. The predominant method for curing concrete products in the district had been the much-abused natural air curing which, due to the climate, had seemed to be all that was required. During the planning stages, J. H. McDonald, field engineer of the Penn-Dixie Cement Corp. gave invaluable help with his broad background of experience and knowledge of plant design.

It was finally decided to combine several of the best ideas obtained and build a plant using a high-temperature, rigidly-controlled, curing system that would provide uniform strengths, low moisture content at a good production rate and at fairly low costs. This would put them in a position to compete on an equitable basis with all other materials used in the district.

Part of kiln room. Note roof construction and height. Boilers are in block-enclosed area over center kilns



Cement and Aggregate Handling

The concrete block plant was completed in May, 1952, and started production immediately. It adjoins the concrete batching plant where the transit-mix trucks are dry-batched by means of weigh batchers. Aggregates

Left to right: J. W. Quillian, Hugo Quillian, and Fred Davis, plant superintendent

which consist of stone and sand are received by rail on the five-car siding on the Florida East Coast Railway. Cement is also received by rail.

Because of the lack of available siding facilities, good unloading equipment was necessary. An 18-in. conveyor belt carries all materials to the bins over the plant directly from pits under the cars. About 500 tons of aggregate is handled in the bins. A 600-bbl. cement bin is supported directly over the plant with an auxiliary 1000-bbl. bin along the siding to provide reserve stocks during the periods of short cement supply. Darex supplied by an automatic dispenser is used in all concrete and products to provide uniform air-entrainment in the mixes.

The main block plant, kilns, and cubing area are enclosed in an aluminum-roofed building. The building framework is made of 1-in. to 3-in. black pipe sections, ingeniously designed with long steel pipe trusses, having a supporting bar joist with wood purlins. Only one interior pillar was required, thus providing a large unobstructed floor area for the operation of equipment within the building. The high roof and open sides provide good air circulation during hot weather.

Kiln Construction

The machine is a late model Besser which is served by a 50-cu. ft. mixer of the same make. Sand and stone are now being used, but provisions have been made to use lightweight aggregates at a latter date. Sand, stone and cement are fed to the mixer from the overhead bins of the batcher plant. The capacity is about 6800 standard units per shift. Space is available for another machine or special equipment, if required in the future.

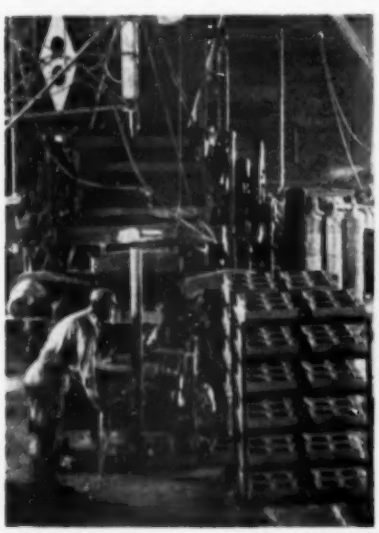
The kilns were designed to provide a continuous, well-controlled operation from the standpoint of operating cost, production and upkeep and at a reasonable initial cost. The kiln area contains a bank of 10 small kilns, 12 x 24 ft., of identical size and design. The average distance from machine to kiln is about 50 ft. Each kiln is designed to take the hourly production of the plant which is 12 racks of block. The size allows 6 in. of space on each side and end of each rack for free air movement around the units. Lights are not required in the kilns because of their size and the high open sides of the building. Good kiln construction was employed using 8-in. pumice block walls with vermiculite fill in the block cells. The flat-slab, reinforced-concrete kiln roof contains a vapor barrier, and was designed strong enough to provide a good storage area overhead and also to house the boilers directly over the center kiln. The remainder of the area over the kilns is now used to good advantage for storage of lightweight aggregates for insulating concrete, spare repair parts and other miscellaneous materials. The interior walls and ceiling of each kiln are plastered with $\frac{3}{4}$ in. of vermiculite insulating plaster and covered with a high-temperature-resisting tar compound to protect the plaster from the steam and moisture. The kilns slope to the closed end to provide clean, dry floors. A 2- x 2-ft. draft door at the closed end of each kiln can be opened or closed from the outside. This provides a good, quick, exhaust draft when required.

Identical size, tight-fitting metal doors, equipped with standard closers mounted on tracks and painted with an asphalt compound, fit tight against the rubber gaskets on the door stops. A novel feature is the provision of an extra door which is used as a spare. This allows one door to be kept aside at all times for repairs or repainting, which eliminates the problem of down-time for kiln door repairs. Fred Davis, superintendent of the plant, estimates that the savings of fuel for steam curing resulting from tight, well-kept doors, more than pays for the cost of the extra door and its upkeep.

Steam-Generating System

The curing system is composed of two, newly developed, 40-hp. Vapor-Clarkson "Kwik-Steam" generators supplied by Littleford Bros. Oil is used for fuel at the rate of about 12 gal. per hr. per unit which is accomplished by the use of adequate automatic controls furnished with the equipment. Steam can be produced in 2 min. after starting by this system. Soft water for the curing system is furnished by a group of eight Culligan standard, residence-type, soft-water units which are refilled each week with Zeolite. Hard water from the well on the property is reduced to the correct degree of softness to prevent formation of scale in the boiler coils.

Each kiln is closed immediately after it is filled and held for about 2 hr. before introducing the steam. A 20 to 40-lb. nozzle pressure of wet steam is then introduced through a 1-in. outlet at the floor in the front portion of the kiln for about 3 to 6 hr. A soaking period of 15 to 20 hr. follows before removing the block to the cubing area. At present 80 percent of the 28-day designed strength is obtained in 7 days. The moisture content is held to 14 to 20 percent of total absorption. Automatic bellows-type steam valves, activated by mercury vapor bulbs in each kiln, control the temperature within close lim-



Left: Block machine with rack holding type of block which is popular in this area. Right: One of the two steam generating boilers

Making decorative block. Note design on block in background

its of variation. Further tests are underway now to use thermo-couples and pyrometers to determine whether or not perfect uniformity of strengths and moisture content can be secured in every section of the kilns by means of better heat distribution. Due to the necessity of using several brands of cement in the area, a series of tests is also under way to try to determine the behavior of each brand and type under the curing methods now in use. Tests of all products are carried on by the Jacksonville laboratory of the Pittsburgh Testing Laboratory.

Block Handling Equipment

Clark and Erickson power-lift trucks are used to handle the racked block and also the cubed block into stock and onto trucks. The entire yard area of about 2½ acres is paved with concrete which permits easier and quicker handling and loading by the lift trucks.

About two-thirds of the present demand is for a half-height unit 8 x 4 x 16 in. The trade likes this size for better looking, exposed masonry exterior walls and masons like to use them because of the weight and ease of handling and laying.

A popular adaptation of this size is the addition of a decorative surface used for trim around doors and windows. The rough decorative surface is applied to the face of the block with a trowel and gives the block the appearance of waves or ridges which look very good when painted in contrasting or blending pastel shades. A mixture of sand and cement tempered with mortar mix is applied to the block in the yard after fully cured. A power block saw is used to provide the other special surfaces and to cut special shapes to order. Superintendent Davis, who joined the firm in fall of 1952, has helped coordinate the many ideas obtained and has incorporated them into the smooth operation of this plant. The demand for high quality products is improving daily, and the units produced by this plant will soon put concrete masonry in the favored class of construction materials in the Daytona Beach market.

Large Precast Concrete Contract

THE MARIETTA CONCRETE CORP., Marietta, Ohio, in association with Precast Building Sections, Inc., New York, N.Y., was recently awarded a $500,000 contract to furnish 170,000 sq. ft. of Marietta precast, insulated, concrete wall panels for the new Grumman Aircraft Engineering Co. plant being built at Calverton, Long Island, N.Y. Work on the project, which started in mid-January, 1953, is expected to be completed in June of this year.

The Marietta firm, an early developer of this type of wall panel construction, will supply all engineering and production advisory services. Precast Building Sections, Inc., will produce the panels in its plant at New Hyde Park, Long Island. The average panel will be 10 ft. x 6 ft. x 5 in. and will weigh 3000 lb.

The type of panel being produced for the Grumman project was developed jointly by The Marietta Concrete Corp. and Ford, Bacon & Davis, Inc., and its first major use was on the multi-million-dollar plant of the Electro-Metallurgical Division of Union Carbide & Carbon Corp., Marietta, Ohio. (See May, 1952, issue of ROCK PRODUCTS, p. 152.)

In addition to the Grumman contract, Marietta is currently producing precast concrete wall panels for an office and laboratory building for a major industrial project at Cambridge, Ohio, and for a new plastics warehouse for Dow Chemical Co., at Midland, Mich. For the latter installation, the panels are being produced in Marietta, Ohio, and trucked 400 miles to the building site for erection.

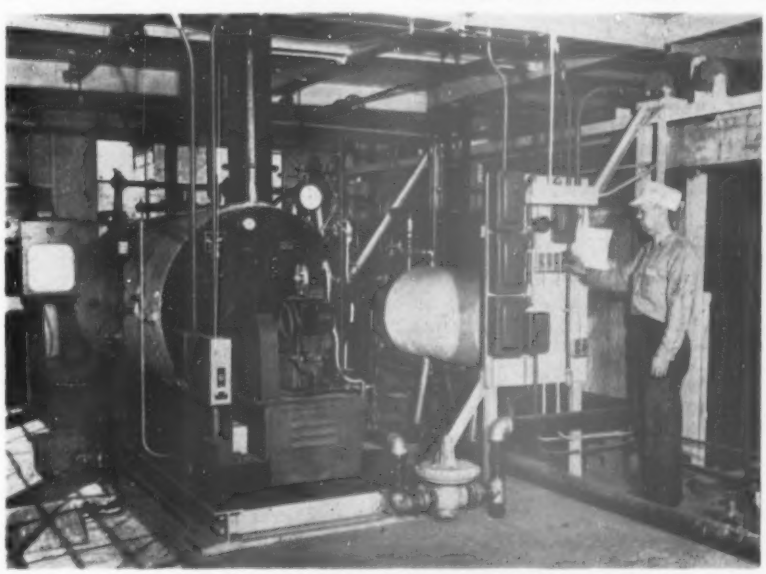
Moves Plant

HUTCHINSON SUPPLY CO., Hutchinson, Kan., has announced the removal of its concrete plant from 100 W. Campbell St. to 3rd and Halstead Sts., Hutchinson. The new location is on a 585- x 325-ft. tract which is serviced by a Santa Fe track. The move was necessitated because a new flood-control project had eliminated the Missouri-Pacific railroad spur which formerly had serviced the plant. Installation of new equipment was also made, increasing plant capacity to approximately 800 cu. yd. of concrete per 8-hr. day. The company's office and sand and gravel plant will also be moved at a later date.

Plant Expansion

ELLIS CONCRETE PRODUCTS CO., Bridgeport, Penn., recently installed an automatic gas-fired boiler, replacing an old coal-fired boiler. The new 50-hp. boiler has been installed on top of one of the kilns, out of the way of plant operations. The space formerly occupied by the old boiler will be utilized for the installation of two additional kilns. Ten kilns, each of which measures 54 x 7½ x 6½ ft., with a 1200 block capacity, are presently being operated for curing block. The company produces standard sizes of hollow and solid cinder block and specially designed block for cesspools.

Replacement of the coal-fired boiler has eliminated the necessity of banking fires over weekends and also reduced labor costs, as well as making possible greater production output in the same amount of space.



Automatic gas-fired boiler on top of kiln

8. A producer views the ready-mixed concrete business . . . .

AIR-ENTRAINED CONCRETE

By JAMES A. NICHOLSON

THERE IS MUCH TO BE LEARNED about air-entrained concrete. Much that has been learned, has not been put to work by ready-mixed concrete producers, contractors, architects and testing engineers. Additional action by the A.C.I. and A.S.T.M. is needed on how to specify, process, handle, sample and test air-entrained concrete.

In many different ways, it has been said that air entrainment is the best thing that has happened to concrete since 1918—the year Duff Abrams so clearly stated his water-cement ratio principles. The dual importance of Abram's achievement and the development of air entrainment has perhaps been best stated by Delmar Bloem: "Proper design of mixes is assurance that the concrete will perform satisfactorily its function in a structure. Air entrainment increases the probability that the concrete will continue to perform that function satisfactorily for many years."

Air entrainment is the purposeful introduction of air into concrete, in controlled amount and in the form of properly-sized, well-dispersed bubbles. In a cubic yard of concrete, about three billion minute, disconnected air bubbles replace a small quantity of water and sand. Although the quality and quantity of the air are largely determined by the air-entraining agent and other factors, the air is actually introduced into the concrete by the whipping action of the mixer.

From the beginning, it should be understood that it is the air itself which is beneficial in air-entrained concrete—not some special property of the air-entraining agent.

In Toledo, during the late 30's, we were using one sack of natural cement per cubic yard to fluff-up the concrete and give the customer a more workable product. Throughout the frost area, where concrete roads were disintegrating under the twin blows of winter and calcium chloride applications, specification writers were either requiring the addition of the natural cement or using other road-building material in place of concrete.

At this same time in the late 30's, a number of New York concrete roads, in which portland cement from certain plants had been used, were standing up in good shape. Some New York roads, in which natural cement had been added to the concrete, were also resisting the effects of salt applications and cycles of freezing and thawing. On several fronts, they found this better-resisting concrete was lighter weight concrete—that contrary to all previous thinking, a lighter weight concrete was standing up better than a more dense concrete. In the New York portland cements, it was discovered that some oil, unintentionally and contrary to specification, had been getting into the finished cement. At about the same time, it was learned that tallow had been used in the processing of the resisting natural cement. The oil and the tallow, intentionally or otherwise, had supplied the protective percentage of air to produce a more durable concrete. Such discoveries convinced authorities that if they could put air into concrete, freezing and thawing, together with salt applications, would be successfully resisted. Cement industry officials, working with Hercules Powder Co. representatives, shortly came up with Vinsol resin. The story of air entrainment began to unfold. The promotion of air-entraining cement by Universal Atlas Cement Co. was started. Customers began to ask us, "What do you know about Duraplastic?" Other leading cement manufacturers soon entered into competition with Universal on the sale of air-entraining cement.

There were some good results; there were also many bad results. A number of problems developed. At the beginning, we knew only that air would be good for concrete. We didn't

Air Entrainment Capsules

● IN THESE AND OTHER WAYS, air entrainment affects the characteristics of concrete: prevents "scaling" due to freezing and thawing or the use of de-icing salts; increases durability, to an unbelievable extent; air voids cushion concrete against expansion due to freezing of contained water; slightly lowers compressive, flexural and "bond-to-steel" strengths in rich mixes; slightly increases strengths in lean mixes; makes concrete more impermeable to the passage of water; provides reinforced steel added protection against corrosion; permits the use of poorer graded aggregates; improves resistance to sulphates; greatly increases workability and cohesiveness; practically eliminates segregation and bleeding; compensates for the shortage of fines in the sand; improves quality and appearance; and provides greater resistance to alkali-aggregate reaction.

In Air Entrained Concrete—

Increased strengths can be obtained by: using lower water, sand and air contents; compensating for added workability by using larger top-size aggregate; vibrating the concrete; using a coarser sand.

Added workability can be obtained by: increasing amounts of air, sand and water; using a smaller top-size aggregate; mixing longer; changing from a manufactured sand to a natural sand (less angularity); lowering temperature of concrete (e.g., eliminating hot cement).

Air contents can be decreased by: using a larger top-size aggregate; reducing amounts of sand, air and water; increasing cement content; adding fly ash or other fine material (e.g., use of finer ground high-early-strength-cement); continuing mixing time beyond a certain point; using concrete materials in higher temperature range; vibrating the concrete; increasing slumps above 7 in., and using coarser more angular sands.

Air contents can be increased by: using a smaller top-size aggregate; increasing slumps up to 6 or 7 in.; reducing the cement content; by going to a finer gradation of the sand (more sand in the 30-50 sieve classification); removing exceedingly fine material (100 mesh and finer); lowering the temperature of the concrete; and increasing length of mixing time up to a certain point.

Strength losses due to air entrainment can be compensated for by: redesigning mixes, cutting down on sand and water; using larger top-size aggregate, possible because of concrete's improved workability and placeability; and using a slightly lower slump, which is just as placeable as a higher slump normal concrete.

know how much air to put in or how to control the amount of air. At the cement plants, by using neutralized Vinsol resin, some of the jumping around, inherent in air-entraining cements, was eliminated. A mortar-air test was worked out to establish closer control over air-entraining cements. Under actual field conditions, it was found necessary to increase the mortar-air test formula several times. In the early days of this test, the percentage limits specified by the A.S.T.M. were 14±4. Later, they were changed to 16±4, then to 18±3. At the present time, some authorities recommend a still higher limit. Others believe that actual field results should take precedence over an arbitrary test formula.

At ready-mixed concrete plants, the use of air-entraining cements presented many problems. Cements varied on the mortar-air test from a 10-12 percent on the low, to a high of 20-22 percent. You never knew what you were going to get. One batch of concrete would test 2 percent air; the next day, a batch might contain 9 percent air, with strengths down 30 or 40 percent. From the start, it was readily apparent that closer control over air content had to be established.

Many who made early use of air-entraining cements, began to believe that to achieve the best results from the development of air-entrainment, the air-entraining agent should be added at the mixer. The early appearance of "Darex" in the picture and the availability of neutralized Vinsol resin hastened the thinking along this line.

To the best of my knowledge, C. E. Wuerpel was the first authority to clearly explain operating problems connected with the use of air entrainment and advocate that, for greatest control over these problems, the air-entraining agent should be added at the mixer.

The Marquette Cement Manufacturing Co., through its president, W. A. Wecker, was the first cement company to publicly advise that with the use of regular cement, together with a controlled addition of an air-entraining agent at the ready-mixed concrete plant, a producer could gain closer control over the air content of concrete.

Today, the ready-mixed concrete operator who is closely controlling the air content of his concrete, is usually adding the air-entraining agent at the mixer by means of an automatic dispenser which has been made as foolproof as possible. (See ROCK PRODUCTS, January, 1950—"Add Air-Entraining Agents at the Mixer.")

In a relatively few years, air entrainment has grown vitally important to many segments of the construction industry. In the North, the development of air entrainment overcame the disintegrating effects of freezing and thawing and saved the construction of roads and streets for the portland cement industry.

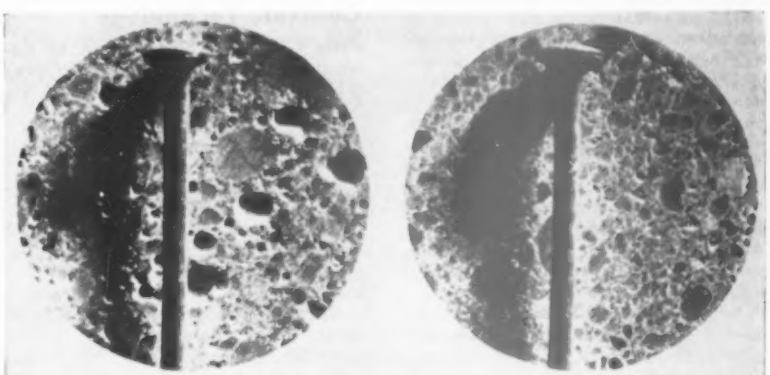
Illustrating the importance of air-entrained concrete in cutting down pavement maintenance costs

Improvements in aggregate and cement performance, resulting from the entrainment of air, have been and are important to aggregate producers and cement manufacturers in aiding sales of a wider quality range of products. Certainly with air entrainment, high quality, durable concrete has been produced with aggregates and cements which had formerly given trouble when used in plain concrete. In exposed concrete, the presence of protective air is a requirement matching in importance the specification calling for the use of quality materials.

Air entrainment has been important to the contractor. With it, the placing of a more uniform, better quality concrete—at lower handling costs—has been made possible. With it, the assured life of the road structure has been substantially lengthened —an improvement in durability of approximately 400 percent, a great percentage increase at no extra cost. Air entrainment, through its added workability, has produced lower construction costs for the builder. In the structure, entrained air has greatly improved quality, durability, watertightness and appearance of the concrete. Purposeful, controlled air entrainment has proven beneficial in most types of concrete work.

Air entrainment has put money in the pockets of road contractors, in savings from reductions in aggregates required for a cubic yard of concrete, and from reduced costs of finishing operations.

Air entrainment has been very important to alert ready-mixed concrete producers. There have been savings in material costs. We have been able to deliver a better product. When properly controlled, the segregation problem has been eliminated. Delivery costs have been sharply reduced. An operator, using a 3-cu. yd. transit mixer, can transport in it 5 cu. yd. of a better quality pre-mixed, air-entrained concrete. Some central mixing producers have been able to use advantageously non-agitating equip-



Typical micro-photograph cross-sections of pavement slab, using normal concrete to the right, and air-entrained concrete to the left. Tiny bubbles can be seen in air-entrained concrete. Common straight pin illustrates actual size of specimens

ment in delivering part or all of their ready-mixed concrete.

It is well agreed that entrained air greatly improves durability, provides a more workable mix, permits savings in time and material, allows the use of poorer graded aggregate, increases the strength of lean concrete, makes concrete more impermeable, holds down temperature rise, checks bleeding, sharply cuts back segregation during transportation and reduces expansion resulting from alkali aggregate reaction.

Factors That Affect The Use Of Air

There are a number of factors which affect the quantity and, at times, the "quality" of air in concrete.

Either increasing the amount of sand or increasing the amount of fines in the 30-50 mesh screen classification of the sand will increase the air content. Sudden changes in sand gradation may affect the quantity of air as much as 2 percent. In gravel mixes, due to the use of a reduced percentage of sand, less air will be entrained than in comparable stone or slag mixes.

In air-entraining cements, the amount of air-entraining agent is supposed to be fixed; in some cases, the amount is neither fixed nor known. If the amount is fixed, a limited range of mixes can be handled satisfactorily with air-entraining cement. In an operation (e.g.—ready-mixed plant) processing a wide range of mixes, including varying top sizes of aggregate, the use of air-entraining cement will not develop sufficient control over the air content of the concrete. With regular cement, adjustments on the amount of air-entraining agent can be easily made so that concrete of optimum air content can be regularly produced.

In wet mixes, of over 7-in. slump, water tends to wash out the air. It is harder to entrain air in rich mixes and dry mixes or in mixes containing larger top-size aggregate than in lean and moderately wet mixes or in mixes containing smaller top-size aggregate. In lean mixes, there are generally gains in strength. In rich mixes or in mixes containing larger top-size aggregate, some strength loss occurs.

The matter of determining significance is the mortar content of the concrete. If cement content and consistency are held constant, mortar content is increased with the use of smaller size aggregate; decreased with the use of larger top-size aggregate. It is this part of the concrete—mortar content—which is protected by the presence of minute, disconnected air bubbles, in adequate amounts.

Regardless of the range in gradation of the coarse aggregate, adequate protection, through air entrainment, can be provided by maintaining a sufficient air content (9 to 10 percent) in the mortar fraction of the concrete.

To get controlled stable air in low slump, larger top-size aggregate concrete, additional mixing time is required. Additional points on mixing time are: (1) in the same length mixing cycle, different mixers entrain different amounts of air; (2) up to a certain point, air content increases with additional mixing time; and (3) prolonged mixing tends to reduce air contents.

Variations in temperature cause differences in air contents. High temperatures tend to reduce and low temperatures tend to increase the amount of air. For a given quantity of air-entraining agent, concrete mixed at 50 deg. F. temperature might be expected to have an air content approximately 30 percent greater than concrete at 70 deg. In the concrete at 100 deg., the air content might be about 20 percent less than concrete at 70 deg.

(To be continued)

Air-Entraining Product

MEARL MANUFACTURING CORP., New York, N.Y., recently announced that it has developed a new, improved, low-cost, air-entraining agent, "Mearlcrete P," which is said to be a reaction production of hydrolyzed proteins with other chemical additives selected to provide foam value and stability. Among its suggested applications are low-density concrete and mortar, rigid thermal insulation and lightweight building products.

Foamed cement paste made with Mearlcrete P is said to be stable and to set to a solid without diminishing in volume or increasing the setting time. Densities as low as 12 lb. per cu. ft. are claimed to be attained readily with its use. At 30 lb. per cu. ft., the compressive strength of cured foamed cement is 300 p.s.i. When used as a thermal insulation, it reportedly provides low thermal conductivity under widely varying conditions of temperature and humidity. It is also recommended for underground pipes. A concrete conduit containing Mearlcrete P foam cement insulation is said to be rot-proof, vermin-proof and moisture-proof.

Concrete Technology

Plain Concrete, Third Edition, by Edward E. Bauer, 441 pages, McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N.Y., $6.00.

NEW ILLUSTRATIONS, DATA and definitions have brought up to date this combination reference book and laboratory manual. The book covers almost every important phase of the design, manufacture and application of concrete and concrete materials, many of them in considerable detail.

Part I relates the history of cement usage, describes the various manufacturing processes for standard portland cement, and discusses physical tests for cement. Special cements are described and evaluated. Further chapters are devoted to admixtures and aggregates. The author defines and classifies aggregates in terms of composition, grading, physical properties and testing. A.S.T.M. specifications are referred to, and quoted in full in many cases, for all materials.

Theories of proportioning are traced from the empirical stage through the Fuller-Thompson studies. Then Abrams' water-cement ratio law is presented; then Edwards' work toward proportioning on a basis of surface area of graded and uniform aggregate; Young's application of Edwards' ideas using Abrams' water-cement ratio, but computing the amount of aggregate on the basis of surface area rather than fineness modulus; the Talbot-Richart studies; and the trial method whereby the mix may be designed as a job progresses. Detailed examples are given for the Fuller-Thompson, Abrams and Talbot-Richart methods.

In a section on applied proportioning, the author discusses general problems and provides sample calculations for nearly all factors in design and control of mixes, including air content and field batch weights. Both Illinois and Michigan modifications of the Talbot-Richart method are developed.

Factors affecting concrete strength are enumerated and explained. Handling and storage of materials, measuring, mixing and placing are treated. Durability, workability, waterproofness and problems of field control are covered at some length. Complete A.S.T.M. standards for ready-mixed concrete and for sampling of cement, aggregates and fresh concrete are quoted. The final chapter of Part I outlines procedures and describes equipment for ordinary testing problems.

Part II, a very complete laboratory manual, quotes complete A.S.T.M. standards for materials and mix tests; instructions for performance of 28 different tests are included.

Pipe Booklet

PRICE BROTHERS CO., Dayton, Ohio, recently announced the publication of a 15-page, non-technical, pipe-laying instructions booklet. Written in workman's terms and language, the booklet describes each step of the pipe-laying process, with accompanying "how-to" photographs and simplified sketches. Copies of the booklet may be obtained from Price Brothers Co., Pressure Pipe Div., 1932 E. Monument Ave., Dayton 1, Ohio.

Awards Safe Drivers

FOUNTAIN SAND & GRAVEL CO., Pueblo, Colo., recently awarded $500 in prizes to its transit mixer truck drivers who participated in safe-driving contest. Presentation of the awards was made by Carl D. Bryan, mayor of Pueblo, at a special ceremony.

Producing Pipe For Seattle Water Project

United Concrete Corp., Los Angeles, Calif., erects pipe plant near site of project. Pipe sections are 21 ft. long in 60 and 72-in. diameters, and are reinforced with steel pipe core and spiral cages

By A. R. MACPHERSON

Crane operating over railroad track dumps concrete into pipe forms while another crane hoists plywood steam curing box over three pipe from which forms have been removed

A MAJOR PART is being played by the United Concrete Corp., Los Angeles, Calif., on the $3,000,000 water pipe project for Seattle, Wash. This company has the entire job of manufacturing the large concrete pipe, delivering the pipe, and carrying out the construction of the 7-mile long pipe line which will connect Lake Young, near Renton, Wash., with Seattle's water supply system near Bow Lake on U.S. Highway 99.

Since United did not have a plant near the new pipe line, a 40-acre site was acquired, located midway between Auburn and Sumner on State Highway 5. Trees and brush had to be cleared from the naturally level areas to construct a large temporary concrete pipe plant to operate on an assembly line basis, manufacturing 1,760 concrete pipe required for the new water line job.

Pipe are 21 ft. in length, with 1,600 units 60 in. in diameter and 160 units 72 in. in diameter. The smaller pipe weigh approximately 15 tons each, with a wall thickness of 6 in., including a ¼-in. steel pipe core placed at a depth of 2 in. from the inside. For further reinforcement, steel spiral cages constructed of ½-in. steel rod are welded to the steel pipes with an intervening space of 2 in.

The assembly line arrangement consists of 18 vertical steel forms, each 21 ft. high, placed in a row between two railroad tracks 1,000 ft. long. Two cranes, one Brown hoist and one Ohio hoist, mounted on railroad trucks, operate up and down the tracks hoisting forms and pipe and carrying concrete batches from the batching plant at the end of the line up to the steel forms. A 4-cu. yd. concrete bucket attached to the 60-ft. boom crane transports the concrete and dumps it into the forms.

The batching plant is the company's own assembled batcher and mixes 2 cu. yd. at a time. A railroad spur running into the plant yard from an adjacent mainline railroad allows bringing in continuous supplies of sand, gravel, cement and steel plate.

An interesting feature of the complete setup includes a fully-equipped, fabrication and welding plant for making steel pipe. Workers fabricate the pipe from plate steel with the help of modern fabricating machinery, weld the seams, and finally weld the steel rod cages around the steel pipes. The whole operation is geared to supply a steady flow of pipe-cages to the concrete pipe production line with an efficient arrangement of machinery and operations resembling a modern factory assembly line.

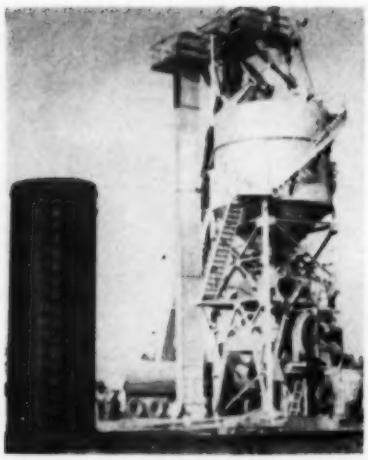
The plant turns out 18 completed pipe units per day. However, production is not continuous since the pipe are subjected to a 60-hr. steam curing process, which gives a strength ordinarily requiring 24 days by the much slower water-curing method.

The day's operation begins with a crane picking up a pipe-cage, moving down the railroad track and hoisting the steel reinforcing pipe over the top of one of the vertical steel forms. When securely positioned at the bottom, another larger steel cylinder form is hoisted and positioned over the pipe-cage to serve as the outer form.

The other crane then goes into operation, loading the bucket with concrete at the batching plant and moving down the track to the prepared pipe form where its load is channeled into the top of the form by workmen. Approximately 7½ cu. yd. of concrete are required for each pipe. Steel ladders on the outer forms enable workmen to direct and control all operations.

Three air vibrators, evenly spaced, and attached near the bottom of the outer forms, vibrate the poured concrete. A Worthington "500" compressor supplies the air. After some 24

Left: Completed reinforcing cages placed on steel pipe core ready for crane to place them in form. Right: Pipe storage yard with assembly production line to the right and batching plant in the background



Concrete batching plant at one end of pipe production line

hours or more the outer steel form is removed and a plywood box large enough to cover three or four pipe is hoisted over the pipe and live steam is turned into the box to complete the 60-hr. curing process.

Finally, the crane hoists the completed pipe from the production line and places it on a truck-trailer which carries the pipe to the adjacent storage yard where it is rolled onto support blocks with the aid of two Hyster lift trucks employing steel cables.

The company also delivers the pipe, using four Ford Cargo King V-8 trucks, each pulling a Fruehauf semi-trailer with flatbed body. The truck-trailers each carry one pipe section per trip, averaging four to five round trips per day, a distance of 10 to 15 miles one way to depositing points along the pipeline right-of-way.

Harold F. Pope is project manager while Robert Twitchell is manager of the pipe plant. Both men are from the company's Los Angeles headquarters.

Concrete Masonry Book

A NEW BOOK, "Manufacture of Concrete Masonry Units," was recently announced by Concrete Publishing Corp., Chicago, Ill. Written by William Grant, chief, Bureau of Tests, Department of Buildings and Safety Engineering, Detroit, Mich., this 184-page book was prepared to meet the existing need of a practical handbook on the manufacture of concrete masonry units. Topics covered include: Development of the Industry; History of Concrete Masonry Machinery; Brief History of Portland Cement Manufacture; Portland Cement and its Reactions; Concrete Aggregates; Cinder Aggregates; Miscellaneous Aggregates; Segregation and Admixtures; Testing of Concrete Aggregates; Grading and Proportioning Aggregates; Mixing and Processing Concrete; Construction of Kilns; Curing Concrete Units; Cracks in Block Walls; Specifications and Testing; Steam Boilers and Their Care; Fuels and Combustion; Boiler Feed Water; Selection of the Block Machine; Miscellaneous Equipment; Notes on the Block Itself; and Technical Notes. Several illustrations and charts are also included.

Concrete Batching Plant

SAN JOSE TRANSIT MIX, recently incorporated, is building a concrete batching plant at San Jose, Calif., at a cost of approximately $200,000. Capacity will be about 140 cu. yd. per hour. Al Bosque is general manager and Walter H. Kunert is batch plant manager.

Concrete Pipe Plant

UNIVERSAL CONCRETE PIPE CO., Columbus, Ohio, has begun operation of its new concrete pipe plant at Miami, Fla., which will service the area of southern Florida below Lake Okeechobee. It is the 26th of the Universal's network of plants, located in eleven states in the East and South.

Machinery at the new plant was supplied by Universal's machinery division in Columbus. The plant is equipped to produce plain pipe in diameters 5 to 30 in. and reinforced pipe from 24 to 120 in., in 8-ft. and longer lengths. In addition the plant will produce Flexicore floor and roof slabs and other precast concrete products.

The new pipe plant consists of a steel frame building which houses the process and curing rooms of concrete block and Flexicore. Construction was under the supervision of W. M. Lafferty, who has been identified with the concrete pipe industry since 1931, with various organizations in Ohio and Kentucky. At one time he was employed in Canada where he designed and built a concrete pipe plant for

W. M. Lafferty, manager of new Miami plant

National Concrete Products, Ltd., Toronto. He joined the Universal firm in August, 1952, and has been appointed plant manager of the Miami plant. John A. Harris is in charge of sales.

Engineers, contractors and public officials got their first view of the plant at a special "open-house," held January 10. In addition to Florida personnel, the following management officials from the Columbus office were in attendance: H. X. Eschenbrenner, president; H. E. Eschenbrenner, executive vice-president; and T. H. Monaghan, general sales manager.

Concrete Masonry Promotion

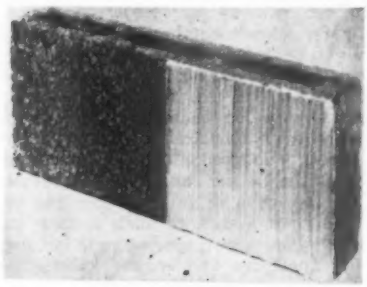
NATIONAL CONCRETE MASONRY ASSOCIATION is participating again this year in three technical bulletins published by the Producers' Council, each of which is distributed to over 10,000 A.I.A. architects throughout the country. A 4-page insert describing the application of concrete masonry to the industrial type of building appeared in the recent Technical Bulletin No. 62, devoted to industrial construction. N.C.M.A. reports that it has found these bulletins to be an excellent means of reaching this important segment of the architectural profession and that the association has received thousands of requests for literature describing the use and application of concrete masonry.

Universal's new concrete pipe plant at Miami, Fla.

NEW MACHINERY

Masonry Surfacer

STROUB PRODUCTS, Totowa Borough, N.J., has developed a masonry surfacer containing a special aggregate



Masonry block before and after surface application

powder which hardens in block pores and crevices. Besides providing a weather and leak-resistant seal, it gives a textured finish to block walls. The Anchor masonry surfacer is available in 12-, 25- and 60-lb. metal cans, in seven colors and white, to be mixed with water and applied with a whitewash brush.

Lubricating Enamels

THE LOCKREY CO., Lubricants Division, Southampton, N.Y., has developed new types of "Liqui-Moly" molybdenum-base lubricating enamels which are now being offered on an experimental basis. The new lubricant coating, called "Molynamel," is claimed to put a lustrous, hard, greasy-feeling but clean coating, from a fifth to half a thousandth inch thick, on any type of surface, over practically any kind of material. It is especially effective on porous surfaces, since it fills the pores and provides a feeding supply of lubricant.

Fork Lift Truck

HYSTER CO., 2902 N.E. Clackamas, Portland 8, Ore., has just announced an 8000-lb. capacity and a 6000-lb. capacity fork lift truck which are gasoline engine powered and mounted on pneumatic tires. The manufacturer claims that the "ZA-80" is the first heavy-duty 8000-lb. industrial truck of its kind that can be operated efficiently indoors as well as out. The "XA-60" model is a 6000-lb. capacity version of the ZA-80, incorporating all the heavy-duty features of the larger truck but with shorter wheelbase, width and over-all length. The XA-60 is claimed to be the smallest and heaviest 6000-lb. capacity truck ever designed.

Gasoline-powered 8000-lb. capacity fork lift truck

Steam-Curing System

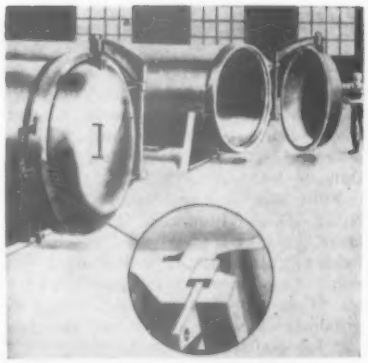
SHORE ENGINEERING, 320 Broadway, New York 7, N.Y., has announced the development of a high-pressure steam-curing system in which each drum has its own steam generator, making possible the installation or operation of one drum at a time. The generators, which work only when steam is being used, do not require licensed attendants. Other advantages claimed for the system include the elimination of transmission losses of steam; improved safeguards against hazards to life and equipment; precise control of steam deliveries to secure thorough uniformity of quality of block produced; and specially calibrated equipment permitting visibility of the rate of steam flow in the individual drums and entire system at all times. The system is designed for a daily block production of 30,000 8-in. units. It is said that any block plant that produces 1,000,000 or more block per year can justify installation of high pressure curing.

Masonry Sealer

A NEW HYDRAULIC CEMENT for stopping water flow through masonry walls has been announced by Peerless Cement Corp., Detroit, Mich. The new product, called "Dike," is said to be a fast-setting, cement-base compound which can be applied by hand and sets completely in four or five minutes. The product was formulated and developed especially by Peerless chemists for plugging leaks in basement walls, swimming pools, fountains, etc., and also for caulking, pointing or repairing chimneys, walls and masonry sills.

Pressure Equipment Door

BLAW-KNOX CO., Farmers Bank Bldg., Pittsburgh, Penn., has brought out a quick-opening door for use on pressure vessels and equipment operating at atmospheric pressure or under high vacuum. It is used in various industries including the concrete block industry for pressure-curing of concrete block. The door can be opened



Quick-opening door for pressure curing autoclaves

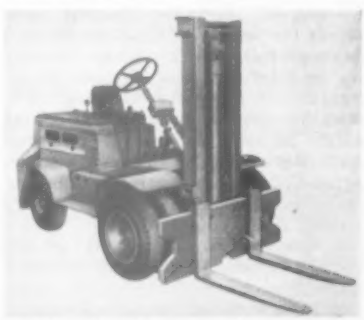
or closed by expanding or contracting a split ring, by means of a hand-operated jack or a hydraulic cylinder and is built to withstand temperatures to 400 deg. F. and pressures to 300 p.s.i.

Pneumatic Transmitter

THE BRISTOL CO., Waterbury 20, Conn., is now marketing Series 650, a miniature pneumatic transmitter for measuring and transmitting temperature, pressure, vacuum, and liquid level readings to recording, indicating and controlling receivers by means of 3- to 15-p.s.i. air pressures. It uses standard measuring elements and transmitting mechanism with one pivot and no flexures, eliminating friction and lost motion.

Fork Truck

CLARK EQUIPMENT CO., Industrial Truck Div., Battle Creek, Mich., has incorporated a three-speed transmission and improved fork-mounting plate in its Yardlift-60 fork truck. Speed ratios between the 1st, 2nd and 3rd gears at gear-changing speeds are said to be less than with a two-speed transmission. The three-speed transmission, available only in the friction-clutch model, has a low-speed gear to enable the truck to climb a 24 percent grade under full load. Its fork mounting is designed for interchangeability of attachments between all comparable capacity truck makes. Dynatork drive and single or dual drive tire models are also available in the Yardlift-60 trucks.



Fork truck with three-speed transmission

Iowa Concrete Conference

THE FOURTH ANNUAL BETTER CONCRETE CONFERENCE was held at Iowa State College, Ames, Iowa, March 19-20, 1953, with a registration of approximately 100 reported.

Following a showing of the new A.C.I.-P.C.A. film on "Quality Concrete," Marts D. Blue of Des Moines, field engineer for the Portland Cement Association, presented a paper on "Concrete Cylinders." In distinguishing between specimens designed for job control and those for quality control, Mr. Blue pointed out that merely keeping specimens near the concrete they represent does not insure any comparable similarity of curing conditions. Temperature and humidity or moisture conditions within a body of concrete may be expected to differ greatly from those for isolated specimens stored near by. He mentioned the excellent practice of placing quality control specimens in moist sand in specially constructed boxes suitable for storage and for transportation to the laboratory. He pointed out, however, that even the use of such boxes does not prevent serious interference with proper curing where temperatures are not controlled, as for example, over a week end in an unheated field office, laboratory or contractor's shack. Careless handling, such as dropping or rolling about in the bed of a truck, can nullify the validity of a test. Important, also, are such details as the provision of properly constructed, thin caps of suitable material (neat cement, cement and plaster, and plaster being among the best). Nearly anything that can happen to a specimen, in violation of the A.S.T.M. specified procedure, tends to make the specimen adversely non-representative and to make the concrete represented appear to be weaker than it probably is.

August R. Krehbiel, technical consultant, concrete products department of The Carter-Waters Corp., Kansas City, Mo., discussed the physical characteristics, mixing, handling and placing of lightweight aggregate concretes.

Mr. Krehbiel brought out the distinction between the two general types of lightweight concrete: structural, the weight being on the order of 100 lb. per cu. ft. (approximately two-thirds the weight of most conventional concretes) and the lighter insulating or filler concretes. Non-structural lightweight aggregates include: vermiculite, perlite and diatomaceous earth. National Bureau of Standards tests were cited to show that structural lightweight concretes (such as haydite, sintered clay or shale, expanded slags, pumice and the scorias) are strongly competitive with conventional concretes, as regards strength, durability and wear. If, in designing reinforced concrete members, he pointed out, advantage is taken of the reduction in dead weight, the savings in steel, handling and related costs invariably more than offset the added cost of the aggregate and any unusual features incidental to using it.

Most of the mixing, placing and finishing difficulties often mentioned and frequently encountered are the result of attempting to carry over bodily, into the lightweight field, the procedures established for ordinary concretes. Mr. Krehbiel emphasized the need for modifying the procedures and urged that the user, especially a new one, establish a working contact with the producer of whatever form of lightweight aggregate he proposes to use.

C. Harold Carlson, vice-president, Weitz Construction Co., Des Moines, discussed precast concrete construction with special emphasis on several important tilt-up jobs recently completed or in progress. He pointed out that this important development in modern concreting continues to bring out new and ingenious improvements both in fabrication and in manipulation of the units.

At a dinner session, Dr. A. Allan Bates, vice-president, P.C.A., who was the principal speaker, delivered a thought-provoking address on present world problems.

Bert Myers of the Iowa Highway Commission reported results of an 11-year study of the expansion of concretes from different Iowa aggregates.

Thomas J. Reading of the Army Engineer Corps reported on the concrete of the Ft. Randal dam project (South Dakota), giving special attention to corps procedures and experiences in the use of air-entrained concrete.

Charles E. Wuerpel, technical director, Marquette Cement Manufacturing Co., Chicago, Ill., discussed "Purposeful Entrainment of Air in Concrete," covering such aspects as: what the entrained air is; why and how it accomplishes what it does; optimum quantities for different mixtures and aggregate gradings; the effect of air-entrainment on strength; and a number of other practical aspects. These last included relationships to the coarse aggregate, the fine aggregate, the cement, water and consistency; the effect of mixer loading and mixing time, temperature, admixtures in the concrete, and finishing and setting time. He also touched upon the effects of vibration and upon the measurement of the air in the concrete.

One afternoon session was devoted to problems of finishing. John J. Hauck, national first vice-president of the Operative Plasterers and Cement Masons (A.F. of L.) of Cleveland, Ohio, discussed the finishing of concrete surfaces, with special emphasis on the need for:

1. An understanding cooperation between owner, architect, engineer and contractor.

2. Correct designs, proper specifications, faithful performance of contract.

3. Efficient supervision and common-sense rules for the same, combined with competence on the part of the workmen at all levels.

4. Materials of the proper quality and quantity; and adequate finishing protection, curing and care after placement.

Mr. Hauck emphasized the shortsightedness of sacrificing the appearance of structures as important as those in concrete by attempting to cut corners on final finishing. Strong emphasis was placed on the need for expert supervision. He also stated that the owner and the contractor are too often at fault in the type of men they assign to such a task as that of inspector, who often is lacking in experience and in the knowledge of what a good job requires.

Edward Matuseski, Ames, Iowa, who is an experienced finisher, discussed "Flatwork as Viewed by a Practitioner." He stated that, besides humidity, the temperature of the air, the concrete and the subgrade are important. If warm concrete is placed on a cold grade, the lower sections will be retarded while the surface sets. Finishing operations may draw water from below and retemper the setting cement, producing a dead, chalky finish. If all the temperatures are high, the rapid set may result in numerous small cracks.

Bleeding, usually present in non-air-entrained concrete, is always important. The amount of water rising to the surface and remaining there is influenced by thickness of slab, temperature, atmospheric humidity, air circulation, type of forms, whether placement is on a waterproof membrane, and other factors.

When normal evaporation is inadequate, recourse must be had to various methods (other than dusting with cement, which he said was a too-common but highly objectionable practice) for removing excess moisture. He emphasized that surfacing finish, hair cracking, dusting, warping and shrinkage are all problems calling for the knowledge, judgment and the manipulative skill of an expert.

J. H. Banker, construction superintendent, P.C.A., Skokie, Ill., brought out several vital points relating to layout, control and placement.

A second session on finishing was completed with a question-answer forum which included the foregoing speakers, augmented by Fred F. Loy, P.C.A. Des Moines, leader; K. P. Ferrell, Dewey Portland Cement Co., Davenport; Maurice Miller, Hawkeye-Marquette Portland Cement Co., Des Moines; Carroll Johnson, contractor, Des Moines; W. R. Sheldon, consulting engineer, Muscatine; R. G. King, Master Bldrs., Des Moines; and Clyde Lighter, architect, Des Moines.

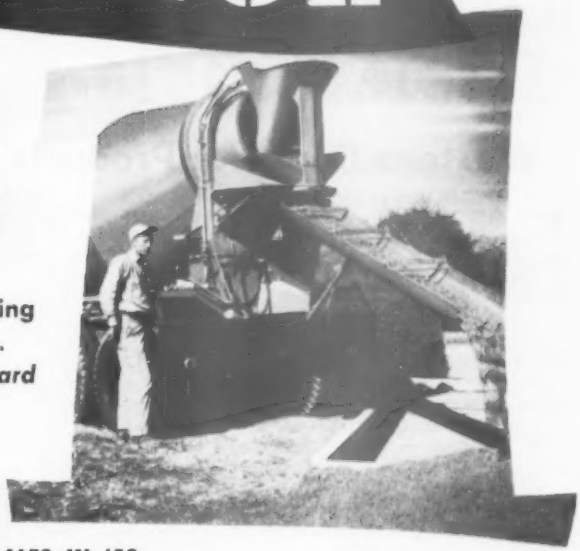
(Continued on page 162)

CHALLENGE

Member
N.R.M.C.A.

TRUCK MIXERS

Follow the example of many leading operators and switch to Challenge in '53 . . .
there's more profit in every cubic yard of concrete you deliver.



FIRST

IN SALES IN '52

Outstanding popularity and value of Challenge Mixers proved in total national sales for '52 . . . figures show Challenge sales exceed all other manufacturers.

AND ONLY COMPLETE LINE OF MIXERS ON THE MARKET

6 different size mixers, each individually rated in accordance with basic NRMCA standards, offers operators the chance to "match the mixer to their truck equipment."

TO INTRODUCE LIGHTWEIGHT MIXER

Challenge eliminated all excess dead weight and unnecessary equipment; gave principal emphasis to larger payload capacity.

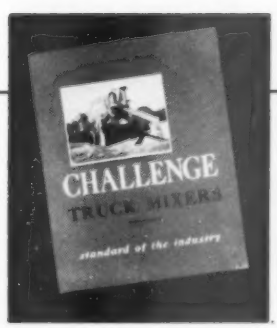
TO USE STANDARD INDUSTRIAL EQUIPMENT

Foregoing a lucrative repair and replacement parts business, Challenge uses standard industrial engines, transmission, clutch, etc., in order to make repair and maintenance easy and at minimum cost.

WITH SIDE ENGINE MIXER

In keeping with our policy of continuous development, Challenge first introduced the Side Engine Mixer in June, 1952 . . . moving center of gravity forward and placing more net payload on heavy duty front axle of the truck.

FIRST TO OFFER THE INDUSTRY A NEW, MODERN, PROFIT-MAKING TRUCK MIXER



COOK BROS. EQUIPMENT CO.
Please send me a copy of your latest Challenge Catalog.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

COOK BROS.
EQUIPMENT COMPANY
3334 San Fernando Road, CLeveland 6-3151
Los Angeles 65, California

Exclusive National Distributor For CHALLENGE TRUCK MIXERS — *Standard of The Industry*

The closing evening dinner meeting was followed by a conference panel session, at which H. J. Gilkey, head of Theoretical and Applied Mechanics, Iowa State College, served as moderator.

A feature new to this year's conference was a report at the Thursday luncheon by M. L. Hurst and C. W. Shirey (past-president, N.R.M.C.A.), both of Waterloo, on the recent National Sand and Gravel and National Ready Mixed Concrete Association conventions in San Francisco. On Friday noon a similar report was given by Prof. Frank Kerekes, member of the A.C.I. board of direction, on the Boston convention of the American Concrete Institute. This attempt to bring the annual conference into contact with the activities of the national organizations covering its field of activity is to become a regular feature of the conference.

Western Concrete Products Meeting

THE CONCRETE PRODUCTS ASSOCIATION of Washington held its 24th annual spring meeting March 20-21, 1953, at the Construction Center Building, Seattle, Wash.

The opening session began with a report by J. W. Sullivan, Verne Frese and E. G. Lowry, who presented the highlights of the National Concrete Masonry Association convention, held recently in Cleveland, Ohio.

R. W. Condon, association president, described the recent activities of a King County organization known as "The Unit Masonry Association," which is composed of concrete and clay products manufacturers, glass block representatives, and representatives of labor organizations. This organization is currently compiling information on comparable sale and resale values of concrete block and frame houses.

The problem of stocking the large number of block shapes in three different aggregates was posed by President Condon to Mr. Frese, chairman of the block standards committee. Mr. Frese suggested that, regardless of the number of sizes and shapes, if there was any need for any or all of them, they should be retained as standards and kept available to the building industry.

The significance of earthquake design to the industry was discussed by W. Beardsley, through the explanation of a recently attempted introduction of a bill in the Washington State legislature, on seismic design requirements. Following considerable discussion on the subject, a motion was passed to request the Industrial Research Division of Washington State College to conduct a survey and study toward the development of theoretical design.

Mr. Frese also described several types of decorative facing material, a promising field in the light of the increasing use of decorative home exteriors.

A session was devoted primarily to committee reports, including a report by E. G. Lowry, safety committee chairman, on "Actual and Hidden Costs of Accidents." Mr. Lowry had made an intensive study of per-man-hour cost of accidents in the several association plants. His studies revealed a wide range of costs per man-hour.

Upon completion of committee reports, Dr. R. L. Albrook, Division of Industrial Research, Washington State College, followed with a discussion and display of materials from the research projects and facilities at the college.

The concrete pipe session began with a discussion on attempts to standardize the dimensions of sewer pipe bells manufactured by association members. C. M. Howard, association engineer-manager, reported the previous action of committee C-13 on A.S.T.M. fill test standards, in that the permeability (fill) test would replace the hydrostatic test with an accompanying probable change in the time length of the test. The location of expansion joints and air vents in concrete irrigation pipelines were discussed by John Roberson, Industrial Research Division, Washington State College.

Following a movie, "How to Make Quality Concrete," shown by the P.C.A., Keith Douglass, plant engineer for B.C. Concrete Co., Ltd., Vancouver, B.C., presented and discussed a paper on "Experiences in the Design and Construction of Prestressed Concrete." Mr. Douglass had taken part in the design, testing and furnishing of several precast, post-tensioned, concrete girders for bridge and building roof construction in British Columbia. Along with photographs, Mr. Douglass pointed out the economic and strength values of these members.

The session was concluded with an outline of the program of the association's forthcoming summer meeting, to be held at the Monticello Hotel in Longview, Wash.

The social highlight of the meeting was a dinner which was attended by approximately 60 members and guests. The guest speaker was Mrs. Elizabeth Wright Evans of the KING-TV staff, who discussed the need for support of an educational television channel.

Expanded Shale Meeting

THE RECENTLY ORGANIZED Expanded Shale Institute held a three-day meeting in Kansas City, Mo., April 13-15, which was attended by representatives from 17 major producing companies from various parts of the country. The Carter-Waters Corp., Kansas City, Mo., and Buildex, Inc., Ottawa, Kan., were member hosts for the visitors.

A number of progressive measures, initiated at the organizational meeting in St. Louis last June and at the second meeting in Dallas last December, were endorsed. Outstanding among the accomplishments is a provision for laboratory study to correlate properties of expanded shale aggregates from the seventeen producing plants. Tests will cover shrinkage, sonic modulus, flexural and compressive strengths. Efforts will be made to establish a standard procedure for moulding specimens of expanded shale concrete for laboratory research, eliminating as many variables as possible so that uniform results can be obtained in any laboratory in the country. Individual members will be supplied with the reports covering their aggregates.

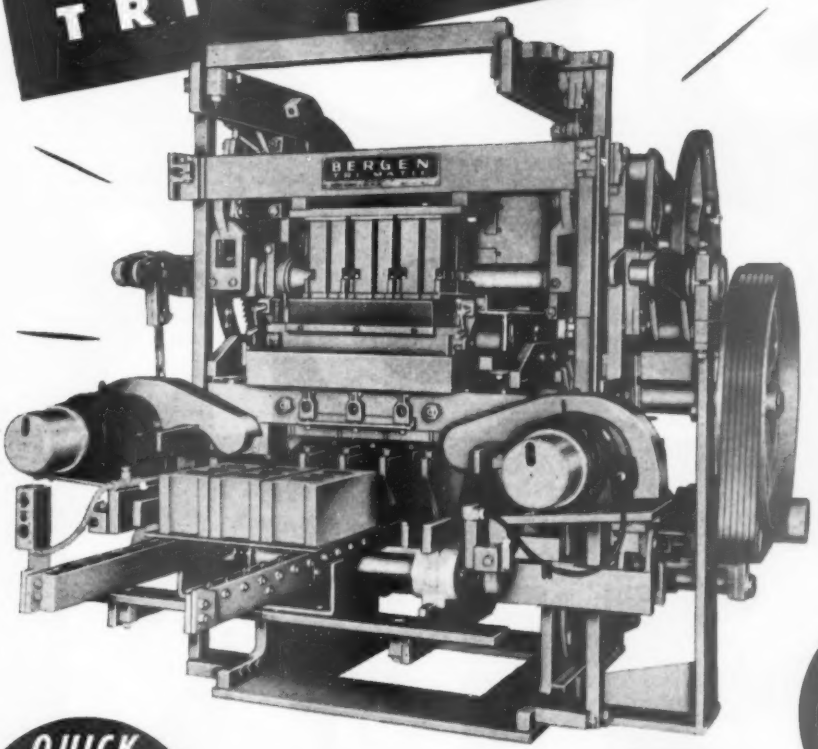
The institute has become a member of the American Concrete Institute and of committee C-9 for concrete and concrete aggregate, of the A.S.T.M. Funds have been allocated for concrete masonry fire tests and for laboratory study of expanded shale concrete which has been exposed to sea water for the past 34 years. Based on preliminary studies, the results of the studies and tests are expected to provide very valuable information to the construction industry. A definite program has been set up for providing technical and pro-

(Continued on page 166)

Officers of Expanded Shale Institute, left to right: W. W. Allen, first vice-president; Geo. Bickel, secretary; A. R. Waters, treasurer; S. Carl Smithwick, president; Alex McVoy, second vice-president; and Frank G. Erskine, managing director

BERGEN TRI-MATIC

THE HIGH-PRODUCTION BLOCK MACHINE



NEW HIGH SPEED CAM DESIGNS

QUICK CHANGE CUT-OFF DEVICE

OUTRIGGER BEARING SUPPORT

QUICK CHANGE SPLIT SPROCKETS

LONG-LIFE BRONZE GUIDE LINERS

QUICK CHANGE AGITATOR GRID DEVICE

MORE THAN NINE HUNDRED 8-INCH BLOCK PER HOUR

Although the BERGEN TRI-MATIC is shipped set up to make 750 block per hour, production of 900 or more per hour can be attained with the proper materials.

Block plant operators who own or have observed the Bergen Tri-Matic perform are convinced you can't beat its efficiency and the clean-cut, uniform block which are produced hour after hour without interruption.

If your plant is lagging behind in production, it will pay you to contact us for additional information and prices. (No obligation of course.)

Phone us "COLLECT" . . . NUtley 2-7300

BERGEN MACHINE & TOOL CO., INC. 189 FRANKLIN AVENUE NUTLEY, NEW JERSEY

STOP . . .
LOOK . . .
LISTEN . . .

The Great NEW Rex 4½-Yard Adjusta-Wate Moto-Mixer

CHAIN BELT COMPANY • 4649 W. Greenfield Ave., Milwaukee 1, Wis.

in at your Rex Distributors

at the great *new* Rex 4½-Yard Adjusta-Wate Moto-Mixer®

to the *facts* he has to tell about the *low weight, biggest legal payloads, low operating and maintenance costs* of this new addition to the Rex line of profit-making Adjusta-Wate Moto-Mixers.

Stacking shingles to the rafters at Bird & Son, Inc., Chicago

How to boost your stock ...with the boss

You can cut materials handling time up to 50% and more all along the line—from receiving, clear through to shipping—with TOWMOTOR! Many users have more than doubled storage space. And only TOWMOTOR gives you TowmoTorque, the amazing new drive that eliminates clutching and gear-shifting. Plus effortless TOWMOTOR Power Steering! Plus revolutionary new Diesels with Cushioned Power! Plus time-tested Preventive Maintenance! Send for booklet describing TowmoTorque and Power Steering. TOWMOTOR CORPORATION, Div. 4905, 1226 E. 152nd St., Cleveland, Ohio.

TOWMOTOR
THE ONE-MAN-GANG

FORK LIFT TRUCKS AND TRACTORS

Since 1919

TOWMOTOR ENGINEERED FOR QUALITY PERFORMANCE

(Continued from page 162)

motional literature for the architectural and engineering fields.

Officers for the coming year are: S. Carl Smithwick, Smithwick Concrete Products, Portland, Ore., president; W. W. Allen, Hydraulic Press-Brick Co., St. Louis, Mo., first vice-president; Alex McVoy, Texas Industries, Inc., Dallas, Texas, second vice-president; George Bickel, The Featherlite Corp., Dallas, Texas, secretary; and A. R. Waters, The Carter-Waters Corp., Kansas City, Mo., treasurer.

The next meeting of the institute will be held in Portland, Ore., sometime in September of this year. Executive offices of the institute are in the Warner building, Washington, D.C., in charge of Frank G. Erskine, managing director.

Iowa Ready-Mix Meeting

THE FIFTH ANNUAL CONVENTION of the Iowa Ready Mixed Concrete Association was held in Des Moines, Iowa, April 1, 1953, with approximately 90 in attendance.

V. P. Ahearn, executive secretary, N.R.M.C.A. and N.S.G.A., who was the principal speaker at the morning session, gave his usual invaluable report on the state of the ready-mixed concrete industry, covering such phases as industrial radio, standard clauses for sales agreements, advisability of maintaining adequate cost records, taxation, labor relations, insurance, and other pertinent subjects. He discussed at length the rising costs of cement along with the short supplies in many areas and stressed that it was up to each individual ready-mixed concrete producer to reduce every possible cost if he is to stay in business during the next two years.

The afternoon session was devoted primarily to a panel discussion. Panel members, who answered both written and oral questions from the floor, consisted of Fred Loy, district engineer, P.C.A., moderator; V. P. Ahearn; J. H. Banker, construction superintendent, P.C.A.; Maurice C. Miller, vice-president, Hawkeye-Marquette Portland Cement Co., Des Moines; Bert Meyers, engineer for Materials and Testing, Iowa Highway Commission; and Chet Woodburn, member of the firm of Dougher, Rich and Woodburn, architects, Des Moines. This type of program was very well received by the members of the association, as was shown by the many questions and discussions which developed during the session.

Grover Beiter, J. C. White Concrete Co., Des Moines, was elected president of the group for the coming year. Other officers are Leon Yates, Ideal Ready Mix Co., Ottumwa, vice-president; and M. L. Hurst, C. W. Shirey Co., Waterloo, secretary-treasurer. The following new board members were elected: John Jacobson, Con Jacobson Co., Marshalltown; How-

Look how D-40 helps produce better, stronger Concrete Blocks

Sharper corners and edges

Increased plasticity improves handling with less breakage

Better appearance—smoother texture, whiter color

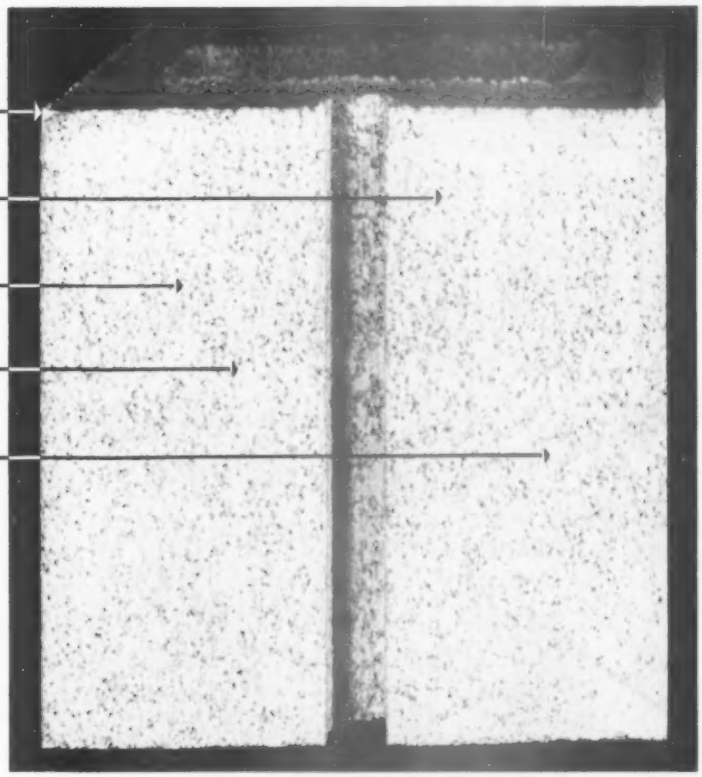
Greater strength due to decrease in water content

Closer bonding—saves on painting and waterproofing

D-40 reduces abrasive wear on mixing and molding equipment

D-40 saves time—mixes pour into molds faster—"break" cleaner

Economical D-40 costs you a fraction of a cent per block



(Block made with D-40. Note the fine texture, color and appearance—the sharp edges and corners)

You will be amazed at the outstanding results obtained by adding one to two ounces of dry, granular D-40 per bag of cement at the mixer. D-40 is a ready-to-use additive supplied in economical 85# bags by Oronite, the world's largest producer of synthetic detergent raw materials.

Let us show you how we have helped other concrete products manufacturers make superior products and at the same time reduce their operating costs. Our experience is at your disposal.

ORONITE CHEMICAL COMPANY

THE NAME TO WATCH IN CHEMICALS

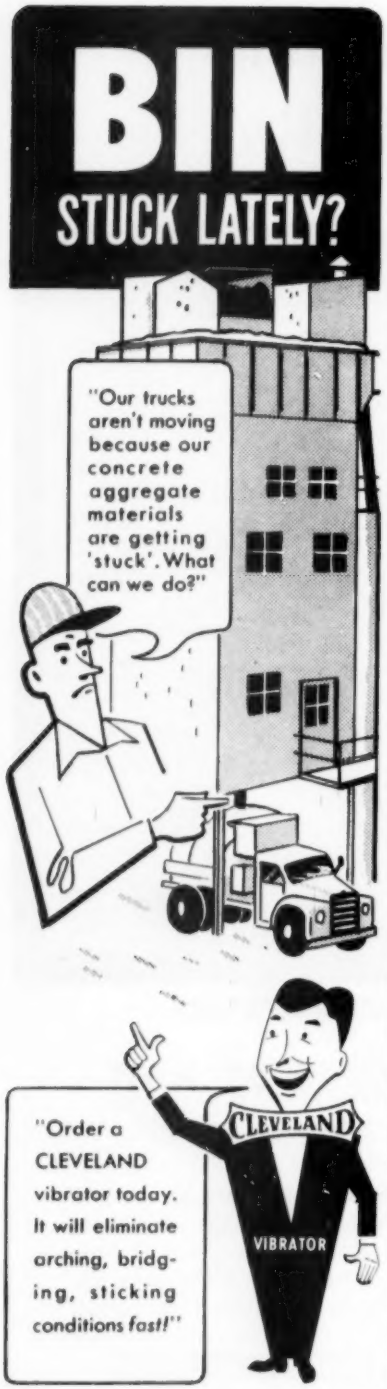
2624

Ready-mixed concrete producers have found D-40 improves their product

For complete information, samples and technical help write or call the Oronite office nearest you

ORONITE CHEMICAL COMPANY

38 SANSOME STREET, SAN FRANCISCO 4, CALIFORNIA
30 ROCKEFELLER PLAZA, NEW YORK 20, NEW YORK
STANDARD OIL BLDG., LOS ANGELES 15, CALIFORNIA
600 S. MICHIGAN AVENUE, CHICAGO 5, ILLINOIS
MERCANTILE SECURITIES BUILDING, DALLAS 1, TEXAS


BIN
STUCK LATELY?
"Our trucks aren't moving because our concrete aggregate materials are getting 'stuck'. What can we do?"
"Order a CLEVELAND vibrator today. It will eliminate arching, bridging, sticking conditions fast!"
CLEVELAND
VIBRATOR

Literature on Request

THE CLEVELAND VIBRATOR COMPANY

2712 Clinton Ave. • Cleveland 13, Ohio

ard Macy, Macy Brothers, Inc., Lynnville; and Walter Wilson, Estherville Concrete Products Co., Estherville. Other board members are: John Northington, W. G. Block Co., Davenport; W. D. Ferguson, Ferguson-Diehl Lumber Co., Jefferson; and Bill Crawford, King's Crown Plaster Co., Cedar Rapids.

Mid-West Concrete Producers Meet

THE 11TH ANNUAL CONVENTION of the Mid-West Ready-Mixed Concrete Association was held at the Drake Hotel, Chicago, Ill., March 30-31, 1953.

The program included a paper by Robert M. Koscielny, junior in civil engineering at the University of Illinois, on "Fly Ash in Concrete." This paper was the winner of the $250 prize offered by the association, for the first time this year, in memory of the late Chesleigh (Dolly) Gray of Indianapolis, Ind. It is to be published in the *Illinois Technograph* in May, 1953.

Other papers included "What the Contractor Expects of the Ready-Mixed Concrete Manufacturer," by Bert Carey, president, Concrete Contractors' Association of Greater Chicago, and "What the Designing Engineer Expects of the Ready-Mixed Concrete Manufacturer," by B. R. Petrie of Fink & Roberts, structural engineers, Indianapolis, Ind.

Stanton Walker, director of engineering of the National Ready Mixed Concrete Association, gave a brief resume of the findings of the national association in its investigations of truck mixing, central mixing and truck agitation of concrete. The complete report is being published and is available from N.R.M.C.A. Much of the findings is said to confirm specifications in use at present, as to loading volumes, speed of rotation and number of rotations required for making good concrete.

Vincent P. Ahearn, executive secretary, N.R.M.C.A. and N.S.G.A., presented some valuable first-hand information as to what is going on in Washington and what the prospects for the industry are in the near future.

A morning was devoted to discussion of two well designed plants: one at East St. Louis, of V. H. Flannery Building Materials, Inc.; and the other, C-J Ready Mixed Concrete Co. at Effingham, Ill. Purpose of this feature was to assist operators who are considering alterations or extensions.

Other program features included a round-table discussion and a speech by Marshall D. Abrams, managing director, Construction League of Indianapolis, on "Health and Welfare Plans in the Construction Industry."

At the business meeting, presided over by President Ernest Horne, Ready Mixed Concrete Corp., Indianapolis, Ind., the following new members were elected to the board of directors for a term expiring with the annual meeting in 1956: Edgar M. Stephens, Stephens Ready Mix Concrete Co., Cairo, Ill.; R. E. Weaver, Lincoln Concrete Products Co., Lincoln, Ill.; and R. J. Jennings, Builders Concrete, Inc., Muncie, Ind. Ernest Horne, by virtue of being the retiring president, becomes a director at large until the annual meeting in 1955.

Officers elected were: R. J. Hummel, Consumers Co., Chicago, Ill., president; D. C. Hay, Kuert Concrete, Inc., South Bend, Ind., vice-president; and L. L. Shidler, Triangle Construction Co., Kankakee, Ill., treasurer. R. E. Hutchins was re-elected secretary for another year.

Concrete Conference

THE FIFTH ANNUAL CONCRETE CONFERENCE in Michigan, sponsored by the Portland Cement Association, was held at the University of Michigan, April 14-15, 1953. Program topics included concrete control and placement; aggregate durability; production methods for both natural and manufactured aggregates; bonding of new concrete to old; economies of precast concrete in building construction; applications of prestressed concrete; and the adaptability of thin concrete shells for long-span roofs.

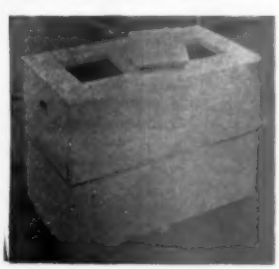
KEEP ABREAST WITH INDUSTRY TRENDS THROUGH ROCK PRODUCTS

Memo . . . "must write today" for full information on

CARPENTER *Profit-Boosting*

SEPTIC TANK FORMS AND HANDLING EQUIPMENT

Concrete producers from coast to coast are reaping extra profits from septic tanks made with CARPENTER Equipment. This method assures big output of quality units, economically produced. *One man* handles our delivery rig.



CARPENTER MFG. CO.
Phone 28938, R.F.D. 1, Box 470
Richmond 23, Va.

22.2% more payload capacity but only 5.8% more cost

This 5½ yd. Jaeger may be a more profitable size for you than 4½ yd. units. Can be loaded under the same height bins

11,150 lbs. here
31,980 lbs. here
5½ CUBIC YARD MIXER
GUARANTEED TO HOLD MIX AND AGITATE ITS RATED CAPACITIES AND CERTIFIED TO COMPLY WITH TRUCK MIXER MANUFACTURERS BUREAU STANDARDS AS APPROVED BY R.M.I.A.
7½ CUBIC YARD AGITATOR

GBW (100 gals water, mixer and 5½ cu yds concrete).....30,330
Truck: A-405 Mack, 183" wb..12,800
GVW 43,130

These weights are achieved without resorting to short-lived construction or unacceptable non-standard drums.

Jaeger "mix plus" model 5½ HMD

This latest 5½ yd. Jaeger "Mix Plus" has 45 cu. ft. more drum volume (22.2% more rated capacity) than a standard 4½ yd. mixer, 45 gallons more water capacity when equipped with 2-compartment tank, and 3" higher discharge.

Yet it is only ½" higher overall (loads under the same bins), weighs only a few hundred pounds more than a 4½, mounts on the same class of trucks with only a slightly longer wheelbase, and costs only 5.8% more than a 4½ yd. unit comparably equipped.

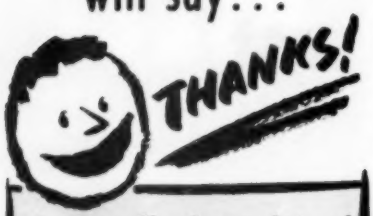
In addition to the 20 latest "Plus" features that are standard in all 1953 "Mix Plus" models, 12 optional choices are available in equipment and attachments. See your Jaeger distributor for full details, or send for Specification TMH-3.

THE JAEGER MACHINE COMPANY

603 Dublin Avenue, Columbus 16, Ohio

World's largest Builder of Truck Mixers, Agitators • Pumps • Compressors • Concrete Mixers • Paving Machinery

Your Customers will say...



when you offer them a choice of

23

DIFFERENT CEMENT & MORTAR COLORS

Made by Williams, this is the broadest selection of fine Cement and Mortar colors on the market. By offering your customers a choice of 23 shades, you can quickly and easily settle upon one having the exact chemical and physical properties your color specification requires.

CEMENT COLORS BY WILLIAMS

Here you have a choice of 18 shades—6 Reds, 3 Greens, 3 Browns, 3 Yellows, 1 Black, 1 Blue, and 1 Orange. Each shade is manufactured to meet the most exacting specifications for cement work—as recommended by the American Concrete Institute and the Portland Cement Association.

MORTAR COLORS BY WILLIAMS

Here you have a choice of 5 different shades — one shade in double strength red, light buff, dark buff, chocolate and black. Each of these colors may be used with excellent results with any standard mortar mix or with a ready-made Bricklayer's Cement.

Write today for color samples and complete technical information on how Williams Cement and Mortar Colors give you superior results. Address Dept. 10, C. K. Williams & Co., Easton, Pennsylvania.

WILLIAMS
COLORS & PIGMENTS

C. K. WILLIAMS & CO.
East St. Louis, Ill. Easton, Pa. Emeryville, Cal.

Concrete and Concrete Aggregates Specifications

PROPOSED SPECIFICATIONS for fly ash and for lightweight aggregates in concrete were focal points of interest during the meetings of Committee C-9 on Concrete and Concrete Aggregates, held in Detroit, Mich., on March 5 and 6 during the A.S.T.M. Committee Week. The development of these standards have been underway for a considerable time and represent many hours of discussion and study on the part of the respective subcommittees. The subcommittee on admixtures recommended the acceptance for committee letter ballot of a proposed test method for fly ash as an admixture to portland cement. A proposed specification is being referred back to the subcommittee for further study.

The subcommittee on lightweight aggregates, after a long meeting, reported that considerable progress was made toward the development of a complete revision of the existing Specifications for Lightweight Aggregate (C 130). The subcommittee reviewed drafts for three separate specifications, covering lightweight aggregate for insulating concrete, structural concrete, and concrete masonry units. It is now expected that definite recommendations for the acceptance of these proposed specifications will be made to Committee C-9 at its next meeting during the 1953 A.S.T.M. annual meeting.

A new Tentative Specification for Liquid Membrane-Forming Compounds for Curing Concrete was accepted for letter ballot of the committee. An additional grading was recommended for immediate adoption for inclusion in those now listed in the Standard Method of Test for Abrasion of Graded Coarse Aggregate by Use of the Deval Machine (D 289). This grading is similar to one recently adopted by the American Association of State Highway Officials.

Proposed methods, authorized for publication for information only, include a pulse velocity method of dynamic testing of concrete and a method of test for thermal coefficient of aggregates.

Much progress was reported in the various subcommittees in the development of data for standardization purposes. This activity includes the examination of cement paste in concrete for air and water voids; the effect of mineral aggregates with respect to bonding; pore spaces in aggregate; a test for volume change of concrete products; the use of SR-4 strain gages for coarse aggregate in measuring volume change; limitations on alkali activity in the present specification for concrete aggregates (C 33); and a coöperative series for evaluating proposed abrasion test methods. A variety of methods, 17 in all, are being reviewed for the purpose of developing a standard method of testing a set time of concrete. This activity will be coordinated with Committee C-1 on Cement.

An innovation in the meeting program of the committee was introduced at this meeting in the form of a presentation of several short papers. Four such papers were presented at the close of the business meeting and were very well received. The papers were essentially in the nature of reports from certain subcommittees, and the subjects and authors are noted as follows: Definition and Methods of Testing Setting Time of Concrete, E. W. Scripture, Jr.; Methods of Testing Reactivity of Concrete Aggregate, R. C. Mielenz; Tests of Truck Mixers, Stanton Walker; and Investigation of the Sulfate Soundness Test of Concrete Aggregate, D. O. Woolf.

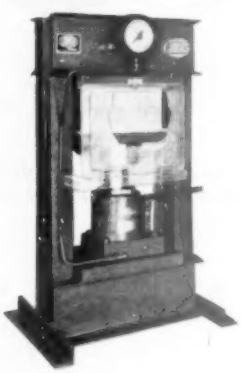
Committee C-9 will meet during the 1953 annual meeting of the society at Atlantic City during the week of June 29. A fall meeting is also scheduled during the week of October 19 at Purdue University.

The officers of Committee C-9 are: Chairman, L. W. Teller, Bureau of Public Roads, U.S. Department of Commerce, Washington, D.C.; secretary, Bryant Mather, Waterways Experiment Station, Jackson, Miss.

•

CONCRETE PRODUCTS Co., Garnett, Kan., formerly owned by George Barndt, has been sold to Earl Farrow, who will operate the plant under the name of Farrow Block Co.

***Jones* COMPRESSION TESTING MACHINE**

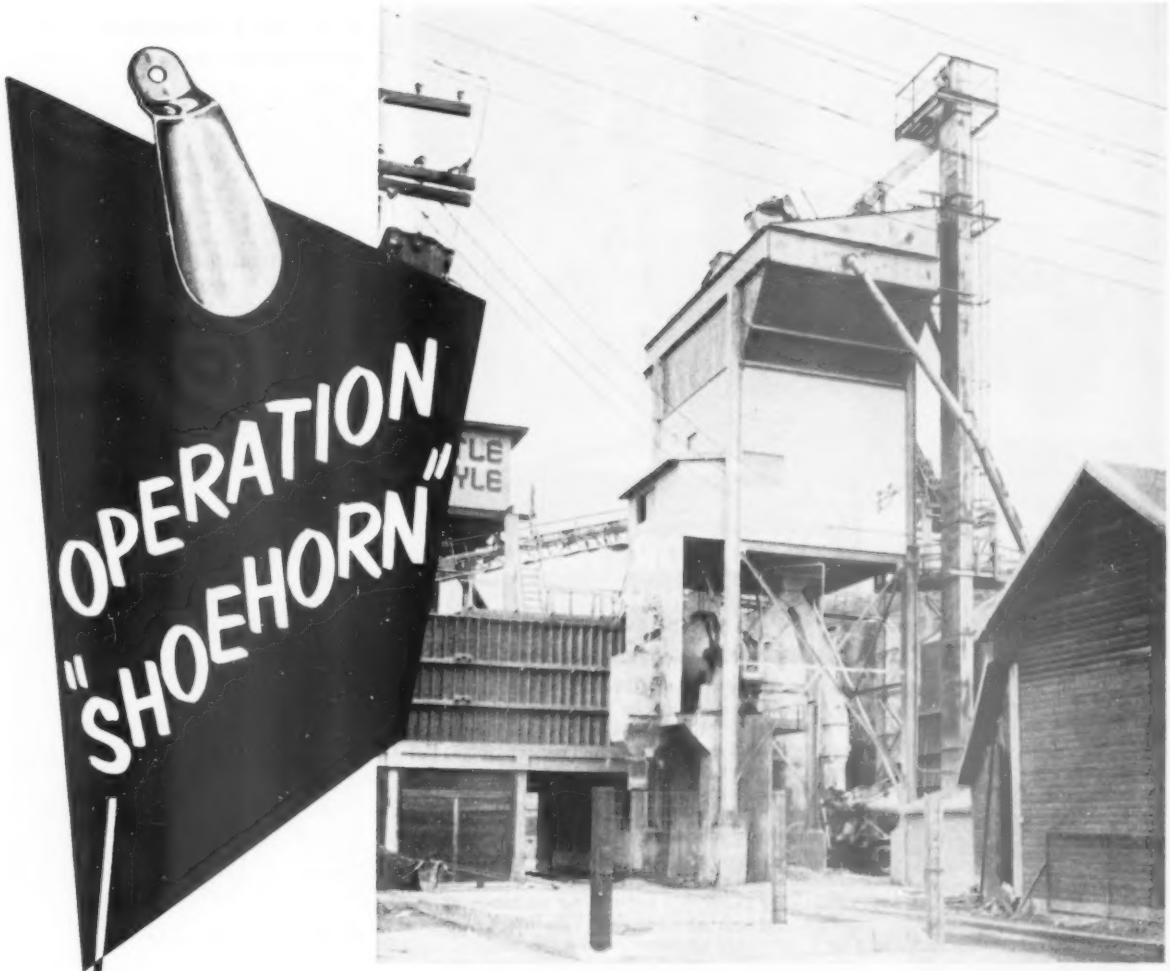


for more economical mixes, and uniformly higher strength

By doing your own testing of concrete blocks and cylinders, you will immediately discover anything which may have gone wrong with the aggregate, grading, mixing, etc. This will help you maintain more uniform quality and develop more economical mixes. The Jones (formerly Yoder) testing machine is low in first cost, specially designed for concrete products plants.

Send for list of satisfied users and literature.

***J. A. Jones* CONCRETE MACHINERY**
108 Horning Road, Pittsburgh 34, Pennsylvania



by the BUTLER ENGINEER

They *had* to expand — but convenience for their ready mixed concrete customers required that they stay in the same cramped downtown location. The yard was too small even for the old plant. Still, the existing buildings had to remain.

The various plans that were submitted looked like jig-saw puzzles — jig-saw puzzles with built-in headaches.

So they called in BUTLER!

Here are just a few things in the BUTLER solution: the aggregate conveyor was designed as a dog-leg with a cut back on its second flight at an acute angle of only 19° in order to get height and clear obstacles in unbelievably small space. Even the overflow downspout turned a corner. But all buildings were untouched — even the old cement bin was utilized — in place. And production was increased enormously.

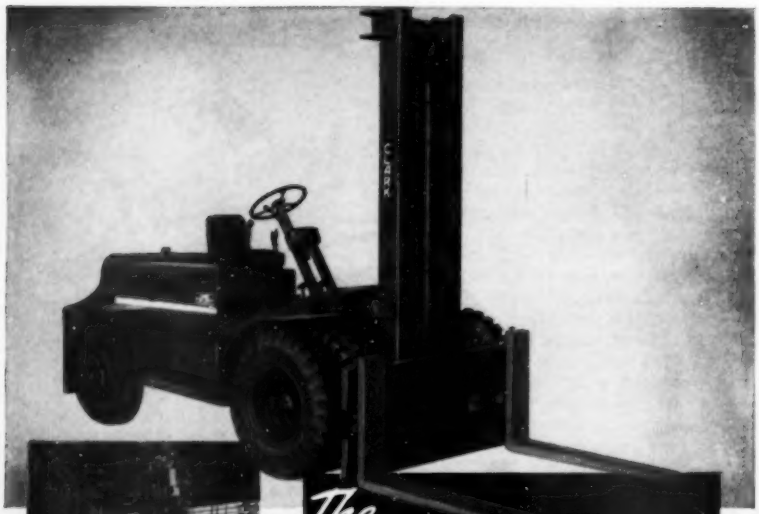
The point is this: when the BUTLER engineer does the planning, everything fits and works like the right key in a lock — even under "impossible" conditions.

(Above.) A BUTLER W-198 Bin with extensions to provide 254 yard capacity and a 2 yard mixer — plus a lot of engineering — brought production up to the required high level.

★

If you want pictures and descriptions of a wide variety of BUTLER Ready Mixed Plants, just write for Bulletin 185. Send a postcard today.

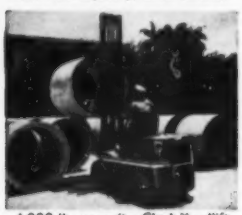
BUTLER BIN CO.
989 Blackstone Avenue
WAUKESHA, WISCONSIN



The OUTDOOR TRUCK With Indoor Smoothness

15,000 lb. capacity, Clark Yardlift

6,000 lb. capacity, Clark Yardlift



4,000 lb. capacity, Clark Yardlift

2,000 lb. capacity, Clark Yardlift

The *New* CLARK YARDLIFT-100—Here's the truck for heavy outdoor handling, Clark's *new* YARDLIFT-100. 5-tons of cargo—in lumber, building blocks, concrete and clay pipe, brick and tile, heavy metal products—handled smoothly over rough, rutted terrain. And power to spare for safe, easy high-tiering of those 5-ton loads.

Built to take the punishment of handling building materials on-or-off the job-site, the YARDLIFT-100 is a natural for all kinds of heavy, outdoor storage and handling. And Clark precision-engineering assures unbeatable efficiency over the long haul—long productive work-hours under the best or worst conditions, with amazingly low down-time.

Easy on the operator, easy on the load, the *new* YARDLIFT-100 is every bit as easy on the pocketbook. It's as cost-conscious as the company comptroller. You owe it to your profit-margin to take a look at the YARDLIFT-100. It will put real economy and efficiency into your handling picture.

A phone call to your Clark dealer—he's listed under "Trucks—Industrial" in the Yellow Pages of the phone book—is the best and fastest way to get the facts and figures on this newest addition to Clark's famous YARDLIFT family.

1903 1953
FIRST FIFTY YEARS
CLARK EQUIPMENT

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS
AND POWERED HAND TRUCKS · INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIVISION • CLARK EQUIPMENT COMPANY • BATTLE CREEK 60, MICHIGAN
Please send: ☐ Yardlift literature ☐ Material Handling News
☐ Have Representative Call.
Name_____
Firm Name_____
Street_____
City_____ Zone_____ State_____
AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

A.S.T.M. Committee C-12 on Mortars

THE USE OF A CERAMIC WICK method to determine the relative efflorescence tendencies of mortars shows promise as a possible standard test method, it was reported at the meeting of Committee C-12 on March 6 during the A.S.T.M. Committee Week in Detroit. A proposed test procedure will be circulated to the entire committee with accompanying data. In considering the specifications for mortar, suggested changes submitted from Committee C-7 on Lime will be studied. Also, attention will be given to a request for a survey of the lime industry to establish the availability of Type S lime [pressure hydrated] throughout the country. Differences between A.S.T.M. specifications in sand used in plaster (C 35) and aggregate for masonry mortar (C 144) were discussed with the results of a survey showing that most sands do not conform to specification C 144. A study will be made of these differences.

A subcommittee is engaged in preparing a preliminary draft of a specification for pointing mortars. Also, the effect of mortar expansion on flat slab construction is being studied, using 8-ft. high piers and cements varying in autoclave expansion from 0.5 to 8 percent. The officers of Committee C-12 are: Chairman J. M. Hardesty, Bell Telephone Laboratories, Inc., Murray Hill, N.J.; secretary, J. A. Murray, Massachusetts Institute of Technology, Cambridge, Mass.

Calcium Chloride

THE HIGHWAY RESEARCH BOARD has announced the publication of an annotated bibliography on "Calcium Chloride in Concrete," compiled by H. C. Vollmer. The purpose of the book is to present complete reference and source information relating to the effect of calcium chloride on the properties of portland cement and concrete for the use of researchers and construction engineers.

The bibliography is chronologically arranged and a listing of the properties of cement and concrete which are affected by the use of calcium chloride is arranged alphabetically in a subject index at the end of the annotated bibliography.

Concrete Short Course

A 3-DAY READY-MIXED CONCRETE COURSE was held recently at the Virginia Military Institute, Lexington, Va., under the direction of the civil engineering department. Over 25 plant operators and superintendents of ready-mix plants in Virginia were in attendance. The course was devoted principally to the design and control in mixing and using concrete. The major portion of the course was in the form of laboratory tests and demonstrations.

First U.S. Zeprex Plant

ZEPREX, a Swedish-developed, masonry building material, is being introduced in the United States for the first time by United States Plywood Corp., which has obtained U.S. manufacturing rights. Manufactured in slab form, Zeprex is used in the construction of walls, ceilings, floors and roof decks. The product, which combines qualities peculiar to concrete with those of wood, reportedly can be sawed, drilled or nailed like wood. Resembling concrete in appearance, it is a lightweight product said to have good insulating and fire-resistant qualities. Technically a siliceous material, it is made of cement, water, monocalcium silicate and other chemicals. It is manufactured in 20-in. widths, in lengths up to 18 ft.

To start production of the material, U.S. Plywood Corp. has bought the assets of National Brick Corp. of Long Island City, N.Y., in exchange for 41,936 shares of common stock. The manufacturing unit, to be known as National Brick Co., will operate as a division of the parent company.

Zeprex, also known as Siporex, was discussed, in regard to its European uses, in the January, 1953, issue of ROCK PRODUCTS, p. 231.

Drain Tile Association

IOWA ASSOCIATION OF DRAIN TILE MANUFACTURERS is a new association recently formed by a group of Iowa concrete products producers. N. W. Nashua has been named president; John DeVries, vice-president; and A. W. Schultz, secretary-treasurer. The main objectives of the association were stated to be: to acquaint all concrete tile manufacturers in Iowa with the new A.S.T.M. specification C-4-50-T for farm drain tile; and to work with P.M.A. and the soil conservation service for better drainage products. The next meeting for the group is scheduled for July 15 and will be held either at Des Moines or Clear Lake.

Prestressed Bridge

A CONTRACT TO BUILD a prestressed concrete bridge in Butler County, Iowa, has been awarded by county officials to Alfred W. Munsen, contractor, Boone, Iowa. This will be Iowa's first prestressed concrete bridge and possibly the first prestressed concrete structure in this state. The bridge deck will be pre-cast by Ziedler Concrete Products Co., at its Waterloo, Iowa, paint.

Pine Flat Dam

COMPLETION OF CONCRETE WORK at Pine Flat Dam, near Fresno, Calif., was reached on schedule, March 20, as recently announced by Army engineers. The total amount of concrete placed was 2,095,039 cu. yd. The first concrete was poured November 1, 1950.

ONE-PIECE GEAR CASE

10 Reasons Why UNIT is a BETTER MACHINE

DISC CLUTCHES

DROP-FORGED PARTS

FULL VISION CAB

UNIT is the ONLY machine on the market with all these time-tested, outstanding features . . . and every one is backed by more than a quarter century of engineering skill and craftsmanship.

INVOLUTE SPLINES

TWIN HOOK-ROLLERS

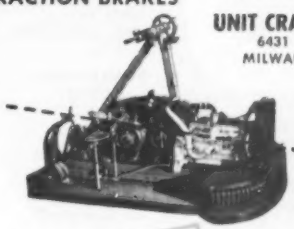
Compare UNIT, part for part, feature for feature, with any other crane or shovel, and you will realize why UNIT leads the field in excavating and material handling equipment.

HEAT TREATING

AUTOMATIC TRACTION BRAKES

Why not investigate what UNIT can do for you? Get the complete story — write today for free booklet "10 Reasons Why UNIT Is A Better Machine."

UNIT CRANE & SHOVEL CORP.
6431 W. BURNHAM STREET
MILWAUKEE 14, WIS., U. S. A.


STRAIGHT IN LINE MOUNTING

WORM DRIVE

Available in Crawler and Mobile Models . . . ½ and ¾ yard Excavators . . . Cranes up to 20 tons lifting capacities . . . Fully convertible to all attachments.

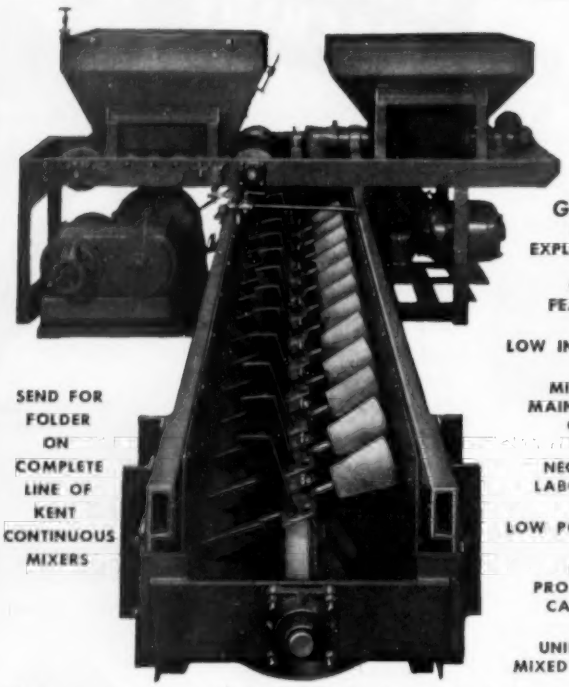
UNIT

UNIT 1020 — ¾ Yard Shovel for tough digging. Fast and easy on the swing.

UNIT 1520 — Heavy Duty Self-propelled Mobile Crane. Capacity up to 20 tons.

All Models Convertible to ALL Attachments!

KENT STEDIFLO for Economical, Volume Production of QUALITY CONCRETE



SEND FOR FOLDER ON COMPLETE LINE OF KENT CONTINUOUS MIXERS

Get the FULL EXPLANATION of these FEATURES

• LOW INITIAL COST • MINIMUM MAINTENANCE COST • NEGLIGIBLE LABOR COST • LOW POWER COST • HIGH PRODUCTION CAPACITY • UNIFORMLY MIXED CONCRETE • CONTROLLED OUTPUT • STEADY PRODUCTION •

WRITE for Complete Information

You can take the satisfied, enthusiastic word of the many KENT STEDIFLO users as your assurance of its efficient, economical operation, it's rugged construction and long service life with a minimum of maintenance expense. We'll be pleased to acquaint you with these fine people.

The **KENT MACHINE COMPANY**

CONCRETE PRODUCTS MACHINERY

Cuyahoga Falls, Ohio

PURE SYNTHETIC IRON OXIDE

GIROX RED

NO. 1100

ESPECIALLY SUITED FOR COLORING BLOCKS

Distribution Points Throughout the Country

FRANK D. DAVIS COMPANY 2704 Santa Fe Avenue Los Angeles 58, California

Volume Change in Masonry Walls

THE NATIONAL BUREAU OF STANDARDS recently issued a report summarizing the results of a recent study by J. W. McBurney, N.B.S., on causes of masonry wall cracking. The investigation indicated that cracking of masonry walls may be caused by the gradual hydration and expansion of mortars containing free magnesium oxide (MgO). The Bureau's conclusions are based on measurements made of expansion in experimental brick walls, on investigations of failures of masonry walls in certain buildings, and on study of published information. Previously, the tendency had been to blame cases of mortar troubles almost exclusively on shrinkage, while delayed hydration as a cause of damage to brick masonry has apparently been overlooked, even though earlier N.B.S. investigations had proven that delayed hydration of magnesium oxide could cause expansion of concretes and of lime-gypsum finish coats on plaster.

Concrete Pipe Outlook

HOWARD F. PECKWORTH, managing director, American Concrete Pipe Association, in his monthly news letter to the association membership, has reported that 1952 was the largest year the concrete pipe industry has ever had and that there is every indication that 1953 will be an even bigger year for the industry. He also stated, however, that among the signs of present good business and continued good business, there were very pronounced and definite signs of stiffer competition in 1953, both within the industry and with competing products.

Adds Block Plant

GLYNN CONSTRUCTION CO., an affiliate of Seaboard Construction Co., is adding a concrete block and brick plant to its ready-mixed concrete facilities at Brunswick, Ga. An additional railroad track will be built at the plant site. Concrete block are to be steam cured. The plant, which will cost approximately $150,000, will have a capacity of 8000 block per day. Officers of the company are H. J. Friedman, president; Alfred W. Jones, vice-president; Potter F. Gould, treasurer; John Gilbert, secretary; and H. L. Friedman, general plant manager.

Safe Driving Awards

FIVE EMPLOYES of Pre-Mix Concrete, Inc., Kennewick, Wash., were recently awarded National Safety Council safe-driving citations for completing one to five years of accident-free driving. One employe who completed five years of accident-free driving, with a total of 150,000 miles, was presented a watch by the company and a 5-year award by the Council.

Concrete Conference

A "BETTER CONCRETE CONFERENCE" was held recently in Denver, Colo., at the University of Extension Center, Department of Civil Engineering. Specifications, production and placement of concrete were the main topics of discussion. Speakers included C. L. Eckel, dean, College of Engineering; Elmo Higginson of the Bureau of Reclamation and also chairman of the American Concrete Institute in Denver; Kenneth R. White, engineer, Denver; Fred Hoppe, secretary, Pre-Mix Concrete, Inc.; Chester M. Schrepferman, Denver contractor; and G. E. Ellis, structural engineer, Portland Cement Association, Topeka, Kan.

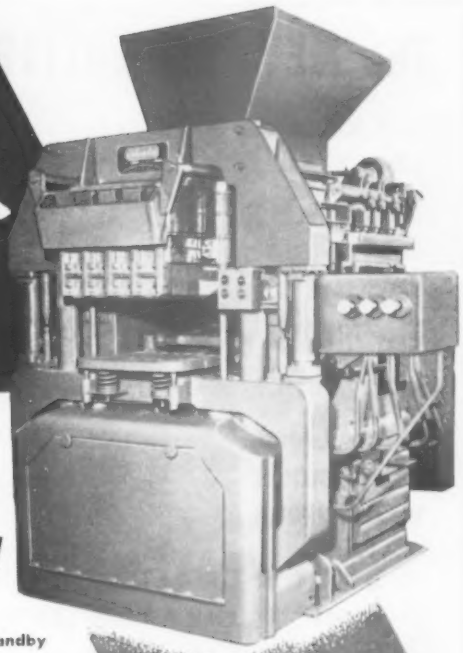
Large Concrete Contract

HELY CONSTRUCTION CO., Boise, Idaho, was low bidder for the operation of a concrete mixing plant for expansion of the atomic energy project at Hanford, Wash. A bid of $637,000 was entered by the Idaho firm on the project which was estimated at $973,000 by A.E.C. engineers. The A.E.C. will furnish the central mixing plant and cement. The contractor will operate and maintain the plant in producing approximately 100,000 to 300,000 cu. yd. of concrete over a 3-year period. About 150,000 cu. yd. of aggregate will be furnished by the contractor, who will supply his own aggregate plant.

Insulated Concrete Block

THERMOFLECTOR CORP., North Sioux City, Iowa, has announced a new aluminum foil-insulated concrete block. Tests conducted at the University of Minnesota indicate the block to be more efficient in eliminating heat loss than any other type of masonry—almost 50 percent more than conventional concrete block. The block are designed with air cells running parallel to permit aluminum insulators to be sealed into the wall as it is built. Use of the block is claimed to effect a 25-45 percent reduction in materials and labor costs, by combining the building and insulating of the walls into one operation.

Columbia's NEW, IMPROVED Fully Automatic 2-BLOCK



leads the field in fast production of high quality blocks!

- 4-6 Cycles Per Minute
- Electronic Controls with Standby Manual Controls
- Vibration Under Pressure
- Standard Plain Pallets

● Far ahead in production capacity: The famous Model 8, 2-Block Columbia offers the operator lower initial investment, PLUS highest quality workmanship, and low maintenance through rugged construction. Proven and tested for years under all aggregate conditions—here's the biggest dollar's worth of machinery on the market today!

OTHER Columbia LEADERS:

Model 12, 3-Block
Columbia Basic Block Machine
Batch Mixers
Block Splitters
Pallet Returns, Cleaners and Oilers

Nationwide Sales, Parts and Maintenance Service with headquarters in the following states: Washington, California, Wisconsin, Mississippi, Florida, New Jersey, South Carolina, and Virginia. Fast service maintained to all parts of the country. Write today for additional information.

Columbia MACHINE WORKS
107 GRAND AVENUE • VANCOUVER, WASH.

Many satisfied customers operating scores of machines.

Write for name of Oswalt-Serviced plant nearest you.

Write for new OSWALT Booklet

Smoother Sailing for VIBRAPAC Owners with New OSWALT SERVICE

GENTLE MOTION in block delivery is featured in the New OSWALT Shock-Free Block Ejector and Front Pallet Feeder. Eliminates green cracking—reduces culls to minimum.

New OSWALT Simplified Device for Height and Density Control automatically insures correct height and constant density of blocks.

Install OSWALT SERVICE *now* . . . it's the SURE way to get production up to 1080 units or more per hour, without sacrifice of quality.

OSWALT ENGINEERING SERVICE CORP.
1335 Circle Ave., Forest Park, Ill. Phones: EStebrook 8-3666, FOrest 6-3898

The NEW SUPERLITE UNLOADER

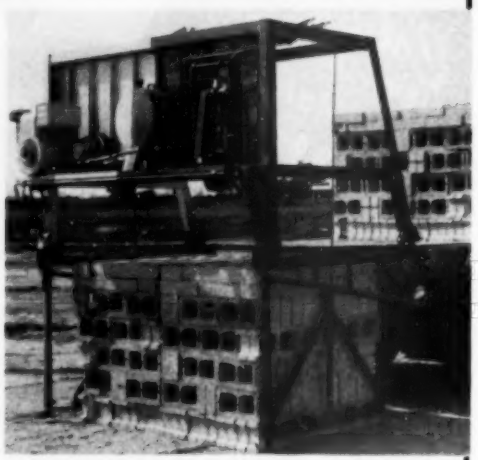
CUTS UNLOADING COSTS 50%

THE ANSWER TO YOUR UNLOADING PROBLEM

LOW INVESTMENT

HIGH RETURN

UNLOADS 1080 8x8x16 BLOCKS IN 20 MINUTES

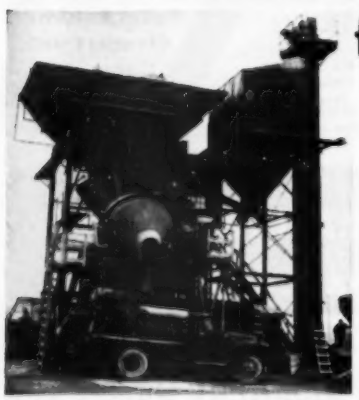


- CAN BE OPERATED ON UNEVEN GROUND
- WEIGHS ONLY 1480 LBS. INSTALLED
- FITS ANY STANDARD FLATBED TRUCK
- CAN BE INSTALLED OR REMOVED QUICKLY

Write for Additional Information

BUILDERS EQUIPMENT CO. 4012 N. Central Ave. Phoenix, Arizona

COMPLETE PLANTS from a Single Source



- "Tilt-Up" Mixers
- Ready-Mix Plants
- Expressway Semi-Portable Plants
- Dry Batch Plants
- Cement Bins
- Aggregate Bins
- Cement Storage

ENGINEERED TO WORK TOGETHER

From conveyor to elevator, from bin to mixer Burmeister equipment is designed and built by the same organization. Because each product is *"engineered to work together"* you are assured less costly "conversions," maximum production speed, accurate delivery of materials, and greater economy of operation. See your nearest Burmeister Distributor or write for details.

FREE CATALOG

Send for new 16-page illustrated Catalog of Burmeister Plants and Equipment.

COMPLETE PLANTS FROM A SINGLE SOURCE

Burmeister

L. BURMEISTER CO., 4529 W. MITCHELL ST., MILWAUKEE 14, WISCONSIN

Adds Vermiculite Division

MACON BRICK AND BLOCK CO., Macon, Ga., has announced the establishment of a new division of the company to be known as Southeastern Vermiculite Co. The new company will operate as a licensed associated plant of American Vermiculite Corp.

A processing plant has been erected on the property of Macon Brick and Block Co. The plant is equipped with an Amverco incline-type furnace with grade separation after expansion. Vermiculite ore will be obtained from American Vermiculite Corp.'s South African mines. American brand home insulation, concrete aggregate, plaster aggregate, fertilizer conditioner and industrial grades will be produced. The products will be marketed in 4-cu. ft. bags.

Plant Expansion

MARIETTA CONCRETE CORP., Marietta, Ohio, is expanding its Baltimore, Md., facilities to provide for production of precast wall panels. Cost of the new plant was estimated at $100,000. Capacity will be 2000 sq. ft. of wall panels per day.

The Marietta company introduced the panels to the industrial building field over a year ago, at which time, it supplied more than 600,000 sq. ft. of precast panels for the multi-million dollar plant of Union Carbide & Carbon Corp. at Marietta. The company was recently awarded a $500,000 contract to supply the panels for a new plant being built for Gruman Aircraft Corp., Long Island, N.Y.

Core Slab Heating System

THE FLEXICORE CO., INC., Dayton, Ohio, has issued a new folder illustrating the use of hollow core floor slabs for heating systems. Entitled, "The Flexicore Split System of Warm Air Panel Heating," it illustrates both the single-duct and counterflow systems with 2-color diagrams of air flow and installation details. This method of heating is said to combine the advantages of panel heating with the circulatory advantages of conventional forced warm-air systems, while, at the same time, eliminating their disadvantages. The folder may be obtained by writing to The Flexicore Co., Inc., 1932 Monument Ave., Dayton 2, Ohio.

Honors Safe Drivers

THE MARIETTA CONCRETE CORP., Marietta, Ohio, recently held a banquet in honor of 47 of its truck drivers who had completed one or more years of accident-free driving. Each man was presented a $25 U.S. savings bond and a safe-driving certificate. A diamond-studded pin was awarded to one employe for completion of 22 years of safe driving, and 10-year service pins were awarded to four employes. The awards were presented by Richard Jacoby, safety director.

Concrete Batching Plant

CONCRETE PRODUCTS CO., Ironwood, Mich., has started limited production at its new concrete batching plant. When completed, the plant will have a capacity of 150 cu. yd. per hour. Storage rooms and garages to house the transit mixer trucks have been built and cement and aggregate weigh batchers have been installed. Other facilities include a 250-bbl. cement storage silo and a boiler plant which will provide for winter concrete-mixing operations. The 15-acre plant site will also provide space for stockpiling of sand and gravel from the company's gravel deposits three miles from the plant. Owner of the company is Charles Hemkes.

Opens Sakrete Plant

TWIN CITY CONCRETE PRODUCTS CO., Minneapolis, Minn., has announced the opening of a new plant in Kansas City, Mo. The company produces Sakrete, a dry ready-mixed concrete, and is also distributor for Medusa cement paints. The Minneapolis plant, established five years ago, is said to have shown an annual production increase of 30 percent. J. M. Lambert is president of the company.

Pipe Company Expansion

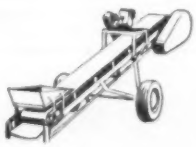
CONCRETE PIPE CO. of Ohio, Inc., recently announced plans for expansion of its concrete pipe plant in Sandusky, Ohio. The company which, this past year, experienced its greatest business volume since its establishment in 1935, expects 1953 to be an even greater year, due largely to the forthcoming construction of the Ohio Turnpike.

Ready-Mix Plant

INTERMOUNTAIN READY-MIX CONCRETE CO. is building a ready-mixed concrete plant at Vernal, Utah. Facilities include a batching plant and a fleet of six trucks. Crushed gravel and sand will be supplied from a company-owned gravel plant at Jensen, Utah. Owners of the company are William Gurr and Cecil Murray.

MIX ON-THE-JOB with the
WILLARD "TASK FORCE"

WILLARD
Weigh-Batch Loader


WILLARD
Mixer Loading Conveyor

WILLARD Truck Mixer

GET MORE DONE with less expense with Willard portables like the typical company shown above. Their fast-operating spread consists of self-loading Weigh-Batcher, Mixer Loading Conveyor and two Truck Mixers . . . all bought for a fraction of the cost of a big stationary plant. Only two drivers, a batcher man and a dispatcher are needed.

You take Willards right to the project for maximum efficiency . . . using multiple stock piled aggregates and bulk cement for specification concrete. Moving to a new location requires no effort beyond digging a shallow pit for the foot of the conveyor. The "Willard Way" is the time-saving way!

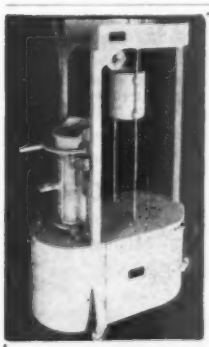
"Wheel the right mix at the right time at the right cost to the right place with Willards."

WRITE FOR THE "WILLARD WAY" BOOKLET

Manufactured in Galion, Ohio and Los Angeles

WILLARD CONCRETE MACHINERY SALES CO.
11700 WRIGHT ROAD, LYNWOOD (LOS ANGELES COUNTY), CALIF.

READY MIX *"the Willard Way"*



BIG PROFITS — SMALL INVESTMENT

THE FASTEST SELLING, MOST PROFITABLE DRAIN TILE ARE MADE ON THE

MARVEL JR. DRAIN TILE MACHINE

Low in cost, rugged, simple—you are in production the day your machine arrives. Small space, no skilled labor, large production, big demand for products.

We are the World's largest manufacturer of aluminum Molds for Ornamental Concrete Products.

Investigate—Write for Bulletin TODAY

CONCRETE MACHINERY CO.
DRAWER 60-CP HICKORY, N. C.

NOW MORE THAN 140 LICENSED MANUFACTURERS *Producing*

Patented
homeward
Concrete STEPS

A Small Investment That Pays Big Dividends

Homeward all metal forms are precision built to produce a product that requires no hand finishing.

The exclusive franchise for your territory may still be open.

For Complete Information Write
ROGER F. WILLIAMS, Licensor
3420 S. W. 9th St. Des Moines (15), Ia.

BARBECUE MOLDS

The Famous "DIXIE" Line for 1953

NOW AVAILABLE

Molds are now available for one of the most profitable products made in precast concrete. Modern designs by a pioneer builder and designer. Write for brochure.

VALLEY HOME & PATIO SHOP

8040 Van Nuys Boulevard

Van Nuys Calif.

SAVES LABOR

SAVES HANDLING

LOW MAINTENANCE

LONG LIFE

34 SPLIT UNITS A MINUTE

Automatically assures split in exact center of block regardless of block variations.

Quickly adjustable for size of block.

the TRU-AX BLOCK SPLITTER

CASH IN ON THE GROWING DEMAND FOR SPLIT CONCRETE BLOCK WITH THIS STURDY PORTABLE MACHINE

ITS MOBILITY SAVES LABOR AND HANDLING. CAN BE MOVED FROM RACK TO RACK ELIMINATING A CUBING OPERATION AND THE LABOR OF ONE OR MORE MEN.

HAND AND PNEUMATIC OPERATION MODELS ALSO AVAILABLE

The TRU-AX HIGH PRODUCTION BLOCK SPLITTERS are patented and embody the best in engineering design and are field tested for dependability and performance.

Write Today for Information

TRUAX MACHINE & TOOL CO.

16 Michigan St.

Seattle 8 Washington

POSITIVE QUALITY CONTROL with NEPTUNE WATER METERS

Simplest, surest way to get consistently better ready-mix batches is *accurately metered* water . . . with a dependable, long life Neptune water meter. Easy to read, saves space, speeds loading, and reduces structural requirements. Your choice of two types: Auto-Stop meter which automatically shuts off the water at exactly the right amount, or manually controlled round-dial meter. Write today for full details.

PRP

NEPTUNE METER COMPANY, 50 West 50th St., New York 20, N. Y.

Branch Offices: ATLANTA • BOSTON • CHICAGO • DALLAS • DENVER • LOS ANGELES • LOUISVILLE • NO. KANSAS CITY, MO. • PORTLAND, ORE. • SAN FRANCISCO

MAKE MORE MONEY WITH VERISET

for
- CONCRETE BLOCK
- SLUMP BRICK

for
- MORTAR
- CEMENT PLASTER

YOU GET

Air Entrainment . . . Super Bonding . . . Reduced Bleeding . . . Less Shrinkage . . . Excellent Workability . . .

AND SAVE CEMENT!

Use VERISET and produce better CONCRETE PRODUCTS.

- Aids Retention of Color
- Eliminates Flaking and Powdering
- Prevents Cracking
- Defies Water Absorption

READY-MIXED CONCRETE PRODUCERS find the use of VERISET to give Unequaled, Consistently Uniform Compressive Strength — WITH BIG COST REDUCTIONS

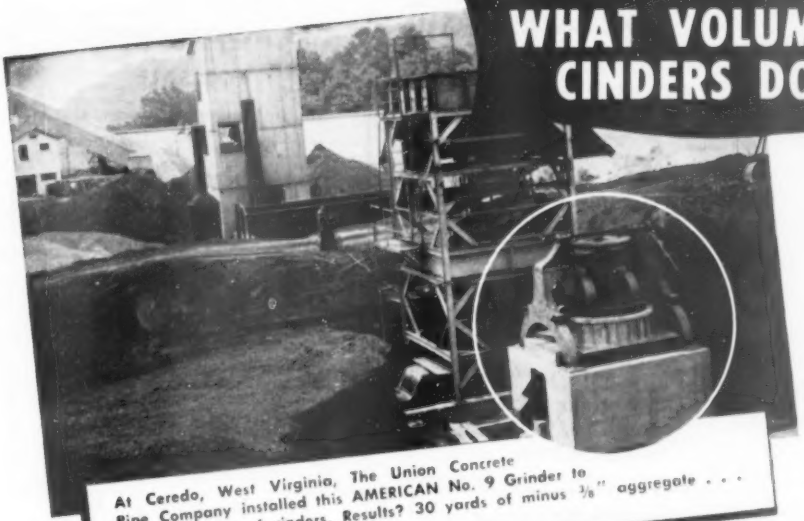
•

WRITE FOR TEST DATA

VERISET CORPORATION

150 Nassau St. New York 38, N. Y.

WHAT VOLUME OF GROUND CINDERS DO YOU NEED?



At Ceredo, West Virginia, The Union Concrete Pipe Company installed this AMERICAN No. 9 Grinder to work on acres of cinders. Results? 30 yards of minus 3/8" aggregate . . . every hour, every day.

Select from 8 AMERICAN Grinders Hourly Output 4 Yards to 75 Yards!

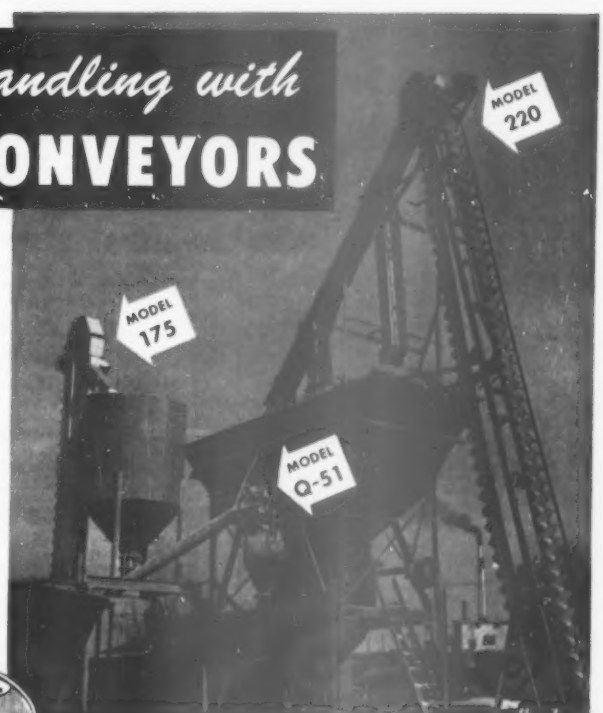
Write your own ticket for your plant's cinder-grinding requirements . . . one of the 8 AMERICAN Grinders will give you the output needed . . . deliver minus 3/8" mesh aggregate without additional separation! Your AMERICAN Grinder will require minimum maintenance . . . will conserve power . . . will help produce low-cost, top-quality cinder block. Write . . . wire . . . phone . . . ask for an AMERICAN grinding expert to help you lick your problem.

CAPACITIES . . . YDS. PER HOUR

No. 5	4	No. 9	30
No. 6	6	No. 482	35
No. 7	12	No. 418	50
No. 8	20	No. 384	75

American GRINDERS by
W. A. RIDDELL CORP.
BUCYRUS, OHIO

Improve Material Handling with BAUGHMAN *Hi-Speed job-fitted* CONVEYORS



There's a low-cost, Hi-Speed, better-built BAUGHMAN for every contracting need—belt-and-bucket, (Models 175 and 220), troughed belt (Model 230), or screw-type (Model Q-51). Before you buy any portable or stationary conveyor, let your distributor demonstrate BAUGHMAN'S years-ahead features—or write for full details.

BAUGHMAN *builds them BETTER!*

- All-welded ALLOY STEEL construction—17% stronger, 30% lighter, 5 times more rust-resistant
- Splined, lifetime-lubricated universal joints and shaft connections
- Extra-rugged construction where it counts

Model TST-10 Bulk Material Transport Body. To haul cement or other dry powdered material. Completely self-unloading by Twin Auger Discharge. Write for complete literature.

There's a Baughman Distributor Near You!

BAUGHMAN MANUFACTURING CO., Inc.
120 Arch St. • Jerseyville, Ill.

CLASSIFIED ADVERTISEMENTS

TRADED IN ON A NEW GOCORP "SENIOR" BLOCK MACHINE

A Real Buy

(1) Fully automatic plain pallet block machine, complete with air type offbearer (less air compressor), all necessary motors and controls and attachments for making (4) 7⅝x3⅝x15⅝ — (3) 7⅝x5⅝x15⅝—(2) 7⅝x7⅝x15⅝—(1) 7⅝x11⅛x15⅝ block, as well as brick attachment, chimney block attachment and a number of specials.
(1) 28' Stearns mixer with built-in Vee belt drive and 20 HP motor (like new).
(60) Steel racks and (1725) ¼x16x18" steel pallets (in new pallet condition). This machine can be seen in operation at J. F. Gomolak Concrete Products Co., Annapolis, Md., and is making on the average of (3400) 8" block per day, or the equivalent. Purchased new in 1949 from Vibra Tamp Machinery Co., Greensboro, N. C., has been well taken care of, and mold boxes and parts can be purchased from another well known manufacturer of block machines.
Price for the above equipment, f.o.b. Annapolis, Maryland $7500.00
(1) 42' Stearns Mixer, complete (like new) $2750.00
(1) 42' Stearns Skip Hoist, complete $750.00
Large assortment of pressed steel cored pallets. Large assortment of Chase steel racks.

METROPOLITAN EQUIPMENT COMPANY
Distributor of GoCorp Block Machines
P. O. Box 4465 Washington 17, D. C.

TRUCK MIXERS FOR SALE

Having to purchase larger mixers. Will sell at bargain prices.
One Ransome 3 yd.
One Smith 3 yd.
Both high Dump end loaders mounted on K8 International.

WILLIAMS READY MIXED CONCRETE CO.
Martinsville, Va.

FOR SALE

One F. C. George-Super V-hydraulic 2 block machine-Series 300 in excellent condition with redifurred mold box and also the regular 3-hole conventional mold box. Also molds for the 12" and 4" blocks. With 1870—8" redif. pallets, 150—round corners, 150—round corners sash block, 100—round corners double sash, 50—single bullnose sash, 583—12" pallets, 592—4" pallets. All of these are aluminum pallets. (Modular size). We also have 2270 of the regular conventional 3-hole block. Will price reasonably.

LINZA GRAHAM LUMBER COMPANY
Scottsburg, Indiana

FOR SALE—PRACTICALLY NEW

1—Columbia 2S Two-Block plain pallet machine. Fully automatic. Electronic control. 4", 8", and 12" chimney block mold boxes.
28—72 Block racks steel.
1,000—18" x 29" Steel Pallets.
1—Truckman.
1—2 Bag Mixer, 10 H.P. motor.
1—LT 60 Towmotor, 6,000 capacity side shifter.
Write or phone: Covino Block & Supply Co., 75 Carteret St., Port Reading, N.J. Woodbridge 8-0938

FOR SALE

3-yd. Jaeger mixer on 1941 GMC, $1950. Good condition.
2-yd. Jaeger on 1941 IHC, $1250. Good condition.
2-yd. Rex on 1941 IHC, no tires, $495. All hi-discharge.

FOSTER CONCRETE CO., Bowling Green, Ky.

FOR SALE

Columbia 2 block fully automatic block machine in very good condition. Reason for selling: Replacing with the new Columbia combination drain tile and block machine that will make both 8" high blocks and 12" long drain tile on the same machine using same racks and plain pallets.

NASHUA TILE COMPANY, Nashua, Iowa

FOR SALE

STEARNS NO. 9 JOLTCRETE with dual vibration, power carriage, boom and air hoist, motors, controls, 4", 8", 10", 12" attachments, 8000 4" Reg, 4000 8" Reg, 500 8" Cor-Sash, 2500 12" Reg, 200 12" Cor-Sash, Steel Pallets.

Equipment operated until March 1953, crated for immediate shipment. Also 43-72 block racks, 2 chase turn tables. Miscellaneous extra cores and spare parts.

STANDARD BLOCK CO., INC.
Box 957, Troy, N. Y.
Tel: ARsenal 3-2736

6-HI PRESSURE AUTOCLAVES

IMMEDIATE DELIVERY WITH QUICK ACTING DOORS. EACH KILN IS CAPABLE OF CURING 4000 8" EQUIVALENTS. PRICED FOR QUICK SALE. IF YOU ARE INTERESTED IN HIGH PRESSURE CURING. IT WILL PAY YOU TO INVESTIGATE AT ONCE.

DINABURG BLOCK CO.
Binghamton, N.Y.

QUINN HEAVY DUTY PIPE FORMS:

1—18" x 48" x 2½" 1—24" x 48" x 3"
1—36" x 36" x 4"

These forms are in excellent condition and are complete with Base Pallets, Headers, Hoppers, and Shoveling Plates.
1—bag Batch Mixer, with or without (5 HP) motor.

BELL CONCRETE PRODUCTS CO., 7th St., at Cotton Belt Tracks, Sulphur Springs, Tex.

CONCRETE BRICK COLORS
CEMENT COLORS
MORTAR COLORS
made by
BLUE RIDGE TALC CO., INC.
Henry, Virginia

FOR SALE

MODEL DPH TRUCK-MAN WITH 27" x 64" PLATFORM AND A POWER OPERATED PUMP.

CRANDALL'S CONCRETE PRODUCTS, INC.
Benton Harbor, Michigan. Phone 5-7696

FOR SALE

1—FMC—180 Fleming block machine.
Molds for 8", 4" and 8" specials.
30 steel racks (48 blocks) and wood pallets.
1—8" belt elevator.
We installed larger equipment so will consider any reasonable offer.

PRESTON R. CARTER BLOCK PLANT
E. 40 Hiway, Russell, Kansas

CEMENT COLORS

Write for free samples and prices of "LANSCO" CEMENT COLORS produced in 50 attractive shades. Packed in bulk and in 1 lb. and 5 lb. packages.
manufactured by
LANDERS-SEGAL COLOR CO.
73 Dulcven St. Brooklyn 31, N. Y.

99 ACROW CENTERS FOR SALE

Excellent condition

Adjustable 10' to 16'

$50 each F.O.B. New Castle, Penna.

Will Sell All or Part

MOONEY BROS. SUPPLY CO.
Mahoning Ave. New Castle, Pa.

FOR SALE

Model 816 New Holland Swing jaw crusher. Complete with 30 H.P. motor, starter and practically new endless transmission belt. $750.00 F.O.B. our plant.

CONCRETE PRODUCTS COMPANY
39 Folly Road, Charleston 43, S.C.

Ready Mix Trucks For Sale

2—Two yard T. L. Smith High Discharge End Loaders. Mounted on 1950 Ford F-6 Trucks with two speed axles. Good condition, running every day. Price: $2800.00 each.

CENTRAL CONCRETE CO.
2231 Papin Street, St. Louis, Mo.
CE 3393

LOWER COST
PACKER-HEAD WINGS

Proved to last as long or longer — yet cost considerably less. Write for prices.

TEXAS FOUNDRIES
LUFKIN, TEXAS

FOR SALE

⅝ yd. Shield Bantan mounted on 6x6 35' boom, bucket and clam, less than 3 years old. A-1 condition. Priced to sell.

J. F. EDWARDS CO.,
114 N. Williams, Box 68, Geneseo, Ill.

FOR SALE

3 Jaeger Hi-Dump 2 cyd mixers—3 cyd., agitators mounted on 1944 GMC 1½ ton trucks 9:00-20 tires. $1500.00 per unit.

Box 67, Frankfort, Indiana

STOP *that* WATER

With FORMULA NO. 640
A clear liquid—7 different resins in a solvent which penetrates 1" or more into concrete, concrete blocks, stucco; seals, holds 1250 psf water pressure. Applies quickly — no mixing — no furring — no membranes—no cleanup. Use on forms—wood or concrete.
HAYNES PRODUCTS CO., OMAHA 3, NEBR.

FOR SALE

1—Used General Electric Motor, Type IC-6, 60 cycles, 550 volts, 25 H.P., speed full load 875 R.P.M. Contact: CINDER BLOCK CO., OF RICHMOND, INC., P.O. Box 5027, Richmond, Va.

FOR SALE

55—72 block racks in good condition. Can be used with plain pallet. Priced for quick sale only $18.00 each.

EAST END COAL & CEMENT PRO. CO.
901 E. 8th St., Winona, Minnesota

ALSO SEE CLASSIFIED ADVERTISING ON OTHER EQUIPMENT IN ROCK PRODUCTS' GENERAL SECTION

FOR SALE

One Multiplex Standard Tamper Power Stripper single block machine with all attachments for sash and etc., for the 8x8x16 block and also attachments for the Rockfaceblock and also attachments for the Panelface block. Plus 2270 pallets. Will price reasonably.

LINZA GRAHAM LUMBER CO., Scottsburg, Ind.

FOR SALE

1—2 Cu. Yd. Jaeger High Dumps Cement Mixers. Mounted on 1944 G. M.A.C. Tandem. (Army).

1—2 Cu. Yd. Jaeger High Dump Cement Mixer. Mounted on 1948 Heavy Duty 2 Ton.

Priced very reasonable. Trucks used daily. MARSICO BROTHERS, P.O. 549, Montgomery, W. Va.

FOR SALE

1948 used Blaw Knox 2 cu. yd. Hi-boy truck mixer in good condition, unmounted. $1500.00. Contact:

MODAHL AND SCOTT

917 E. Grove, Bloomington, Ill.

FOR SALE

MANHOLE BLOCK ATTACHMENT AND PALLETS FOR #9 JOLTCRETE. BOX L-61, CONCRETE PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Ill.

FOR SALE

42" Stedman—2 row Heavy Duty Disintegrator. Less than 60 days usage. New inner cage and end liners. 40% less than original cost. SPRINGFIELD CEMENT PRODUCTS CO., 1800 N. Limestone St., Springfield, Ohio. PH: 5-1504

DISTRIBUTORS AND REPRESENTATIVES

Excellent opportunity to handle out-standing concrete additive which gives increased compressive strength of up to 20%. Excells in air entrainment, workability, less bleeding, water proofing of concrete and mortar. Contacts with Ready-mix plants. Architects or Contractors desirable but not essential. Full technical cooperation assured. Box L-58, CONCRETE PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Ill.

A large New Jersey Concrete Concern has an opportunity for a ready mixed concrete truck Dispatcher, must be experienced. Please write in care of BOX L-43, ROCK PRODUCTS, 309 West Jackson Blvd., Chicago 6, Illinois.

FOR SALE

2 Hydro-Korpak Block Machines.
3200 Pallets 8x8x16. 1000 Pallets 12x8x16.
1400 Pallets 4x8x16.
One Rotary Pallet Dunker.
Can be seen in operation. Installing larger equipment. Best offer takes.

BAILEY DUNBRIK COMPANY
St. Augustine, Fla.

BUILD GOOD WILL FOR '53

With U.B. Line stretchers the most economical way, to keep your name before your mason's and mason contractors every working day of the year. Line pins, twigs, corner ties, and tools for the Bricklayer.

UNITED BUILDERS
1822 Lindberg Drive, Muskegon, Mich.

WANTED

1 KENT HYDRAULIC 2 BLOCK CORE PALLET MACHINE.

1 SYNTRON VIBRATORY FEEDER, F-21 OR F-22 WITH FLAT PAN FEEDER, COMPLETE WITH CONTROLS.

1 FIVE CUBIC FOOT MULTIPLEX MIXER. COMPLETE WITH DRIVE.

1 COMPRESSION TESTER.

1 GRADATION ANALYZER.

EQUIPMENT MUST BE IN GOOD CONDITION. WRITE BOX L-57, CONCRETE PRODUCTS, 309 W. JACKSON BLVD., CHICAGO 6, ILL.

WANTED TO BUY

42" AND 48" QUINN HEAVY DUTY HAND CAST USED CONCRETE PIPE FORMS. MUST BE IN GOOD CONDITION.

MACON CONCRETE PIPE COMPANY

P. O. Box 184, Macon, Georgia

TRUCK MIXER FOR SALE

One 3 yd. Smith High discharge mounted on GMC, 6 x 6 truck, in operation daily. Recently overhauled and painted. Priced $2500.00.

WALTERS SAND CO., MANHATTAN, KANSAS

UNBREAKABLE
PALLET RINGS
Write for full information
TEXAS FOUNDRIES
LUFKIN, TEXAS

FREE SERVICE for Buyers

Get information and prices quickly on machinery, equipment. Check item (or items) about which you desire information. Send to us.

Send To:

Research Service Department

ROCK PRODUCTS

309 W. Jackson Blvd. Chicago 6, Ill.

- Admixtures, Aggregate
- Afterconlers, Air
- Agitators
- Aggregates (special)
- Air Separators
- Asphalt Mixing Plants
- Bagging Machines
- Bags
- Barges
- Batchers
- Belting, Conveyor, Elevator, Power Transmission
- Belting, V-type
- Belt Repair Equipment
- Bin Level Indicators
- Bins and Batching Equipment
- Bits
- Blasting Supplies
- Block Machines, Concrete Building
- Bodies, Trailer
- Brick Machines and Molds
- Buckets
- Bulk Cement Handling Equipment
- Bulldozers
- Cars, Industrial
- Central Mixing Plants, Concrete
- Classifiers
- Clutches
- Coal Pulverizing Equipment
- Concentrating Tables
- Concrete Mixers
- Concrete Mixing Plants
- Concrete Specialty Molds
- Concrete Waterproofing and Dampproofing
- Conveyors
- Crushers
- Coolers
- Cranes
- Curing Equipment
- Derricks
- Dewatering Equipment, Sand
- Diesel Engines
- Dragline Cableway Excavators
- Draglines
- Dredge Pumps
- Drilling Accessories
- Drills
- Dryers
- Dump Bodies
- Dust Collecting Equipment & Supplies
- Electric Motors
- Engineering Service, Consulting and Designing
- Explosives & Dynamite
- Fans and Blowers
- Feeders
- Fifth Wheel, Heavy Duty Special
- Flotation Equipment
- Front End Loaders
- Gasoline Engines
- Gear Reducers
- Generator Sets
- Grinding Media
- Gypsum Plant Machinery
- Hard Surfacing Materials
- Hoists
- Hoppers
- Kilns: Rotary, Shaft, Vertical
- Locomotives
- Lubricants
- Magnetic Separators
- Masonry Saws
- Mills
- Pipe
- Pumps
- Scales
- Screen Cloth
- Screens
- Scrubbers: Crushed Stone, Gravel
- Shovels, Power
- Speed Reducers
- Tanks, Storage
- Tires and Tubes
- Torque Converters
- Tractor Shovels
- Tractors
- Trailer Dump Bodies
- Trucks, Bulk Cement
- Trucks, Industrial
- Trucks, Mixer Body
- Trucks, Motor
- Valves
- Vibrators
- Welding and Cutting Equipment
- Winches
- Wire Cloth
- Wire Rope

If equipment you are in market for is not listed above, write it in the space below.

_____

_____

_____

Your Name_____ Title_____

Firm Name_____

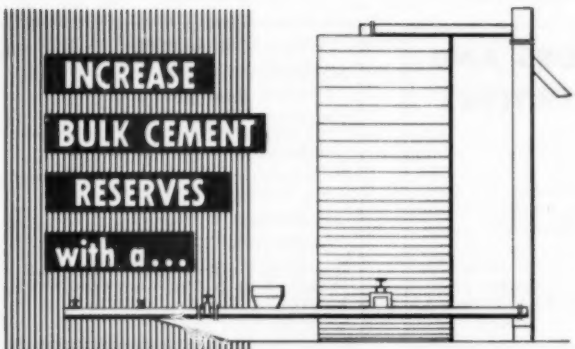
Street_____

City_____ State_____

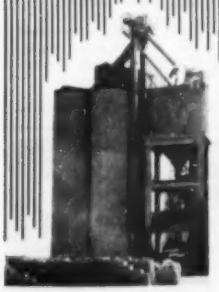
CP-5

INCREASE BULK CEMENT RESERVES with a...

MARIETTA storage system



With a large capacity MARIETTA storage system, with its multiple silos, you can stockpile bulk cement reserves, avoid shortages and keep your production high. As the sketch shows, MARIETTA concrete stave silos can be used with pneumatic conveyors, or any type of materials handling equipment. These sturdy, fire-resistant tanks give you large capacity, low cost handling, keep your bulk cement in an "always ready-to-use" condition. Write for details on new methods for storing, handling bulk cement.



The MARIETTA Concrete Corp.
MARIETTA, OHIO

BRANCH OFFICES:
501 Fifth Ave., New York 17, N. Y.
Pulaski Hwy. at Race Rd., Baltimore 21, Md.
805 Bessemer Bldg., Pittsburgh 22, Pa.

DUR-O-WAL WITH TRUSSED Design

LOOK!...Now It's Butt-Welded!

• High tensile, premium quality steel is embedded in the mortar joint for durability when you use Dur-O-wal. This backbone of steel is designed to assure maximum strength by utilizing the trussed design, architecture's oldest reinforcing principle. Dur-O-wal works fast, cuts time, saves money. Investigate this *patented* reinforcing, available in both flush and butt weld, today!

Dur-O-wal Products, Inc.
P. O. Box 628
Syracuse 1, New York

Dur-O-wal Div., Dept. 656
Cedar Rapids Block Company
Cedar Rapids, Iowa

Dur-O-wal Division, Frontier Manufacturing Co.
P. O. Box 49, Phoenix, Arizona

INDEX TO ADVERTISERS IN THE CONCRETE PRODUCTS SECTION OF ROCK PRODUCTS

SEE INDEX OF ROCK PRODUCTS SECTION ADVERTISERS ON PAGES 191, 192

Bailey Dunbrik Company 181
Baughman Manufacturing Co., Inc. 179
Bell Concrete Products Co. 180
Bergen Machine & Tool Co., Inc. 163
Besser Manufacturing Co. 144
Blue Ridge Talc Co., Inc. 180
Builders Equipment Co. 176
Burmeister, L., Co. 176
Butler Bin Co. 171

Carpenter Manufacturing Co. 168
Carter, Preston R., Block Plant 180
Cedar Rapids Block Company 182
Central Concrete Co. 180
Cinder Block Co. 180
Chain Belt Company 164, 165
Clark Equipment Company 172
Cleveland Vibrator Company 168
Clipper Manufacturing Co. 141
Columbia Machine Works 175
Concrete Machinery Co. 177
Concrete Products Company 180
Concrete Transport Mixer Co. 139
Cook Bros. Equipment Company 161
Covino Block & Supply Co. 180
Crandall's Concrete Products, Inc. 180

Davis, Frank D., Company 174
Dinaburg Block Co. 180
Duraplastic 134
Dur-O-waL Products, Inc. 182

East End Coal & Cement Pro. Co. 180
Edwards, J. F., & Co. 180

Foster Concrete Co. 180

Haynes Products Co. 180

Jaeger Machine Company 169
Johnson, C. S., Company 136, 137
Jones, J. A., Concrete Machinery 170

Koehring Co. 136, 137
Kent Machine Company 174

Landers-Segal Color Co. 180
Linza Graham Lumber Co. 180, 181

Macon Concrete Pipe Company 181
Marietta Concrete Corp. 182
Marsico Brothers 181
Master Builders Co. 183
Metropolitan Equipment Co. 180
Modahl and Scott 181
Mooney Bros. Supply Co. 180
Multiplex Machinery Co. 143

Nashua Tile Co. 180
Neptune Meter Company 178

Oronite Chemical Company 167
Oswalt Engineering Service Corp. 175

Riddell, W. A., Corp. 179

Schield Bantam Co. 140
Service Engineering Company 138
Smith, T. L., Company 142
Springfield Cement Products Co. 181
Standard Block Co., Inc. 180
Stearns Manufacturing Company 184

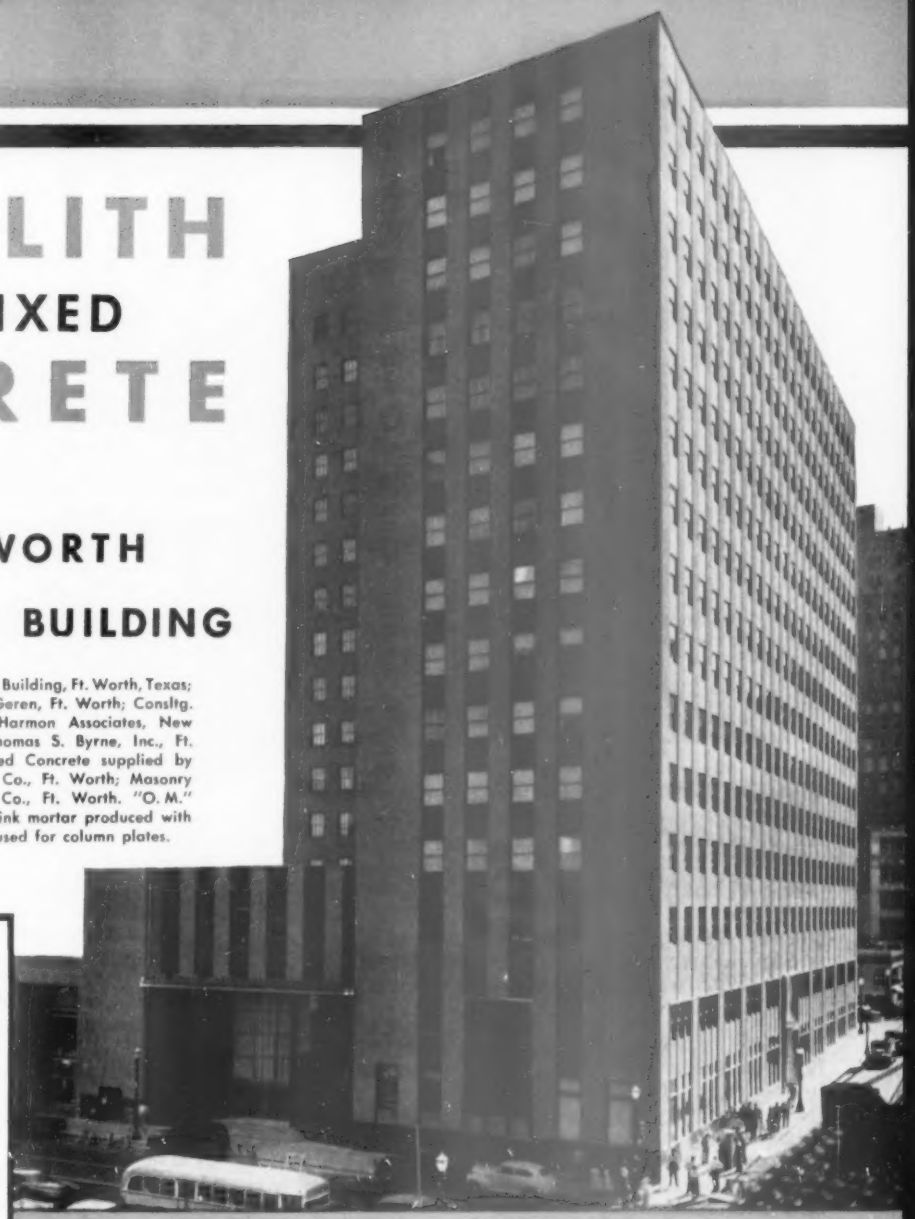
Texas Foundries 180, 181
Towmotor Corporation 166
Truax Machine & Tool Co. 178

Unit Crane & Shovel Corp. 173
United Builders 181
United States Steel Corporation 134
Universal Atlas Cement Company 134

Valley Home & Patio Shop 178
Veriset Corporation 178

Walters Sand Co. 181
Willard Concrete Machinery Sales Co. 177
Williams, C. K., & Co. 170
Williams Ready Mixed Concrete Co. 180
Williams, Roger F., Licensor 177

POZZOLITH READY-MIXED CONCRETE IN THE FORT WORTH NATIONAL BANK BUILDING



The Fort Worth National Bank Building, Ft. Worth, Texas; Archt. & Engr.—Preston M. Geren, Ft. Worth; Consltg. Archt.—Shreve, Lamb and Harmon Associates, New York City; Gen'l. Contr.—Thomas S. Byrne, Inc., Ft. Worth; Pozzolith Ready-Mixed Concrete supplied by Fort Worth Sand & Gravel Co., Ft. Worth; Masonry work by Barbour Masonry Co., Ft. Worth. "O. M." employed in mortar. Non-shrink mortar produced with Master Builders EMBECO used for column plates.

CEMENT DISPERSION ALSO KEY TO SUPERIORITY OF COLORCRON— ANOTHER MASTER BUILDERS PRODUCT

COLORCRON . . .

A pre-mixed, ready-to-use dust-on material for coloring and hardening concrete floors or pavements. Provides beauty and long wear for light traffic areas in and around homes, churches, apartment houses and offices. Available in a wide range of colors.

Pozzolith Ready-Mixed Concrete is *better quality concrete . . .* that is the reason for its wide use in such noteworthy structures as this modern bank building.

Among the improved qualities obtained with Pozzolith Concrete are the following:

- GREATER DURABILITY — for longer life concrete
- REDUCED SHRINKAGE — for less cracking
- LOWER PERMEABILITY — for less "waterproofing" expense
- MINIMIZED SEGREGATION — for better appearance
- INCREASED BOND-TO-STEEL — for better construction
- EASIER PLACEABILITY — for lower placing costs

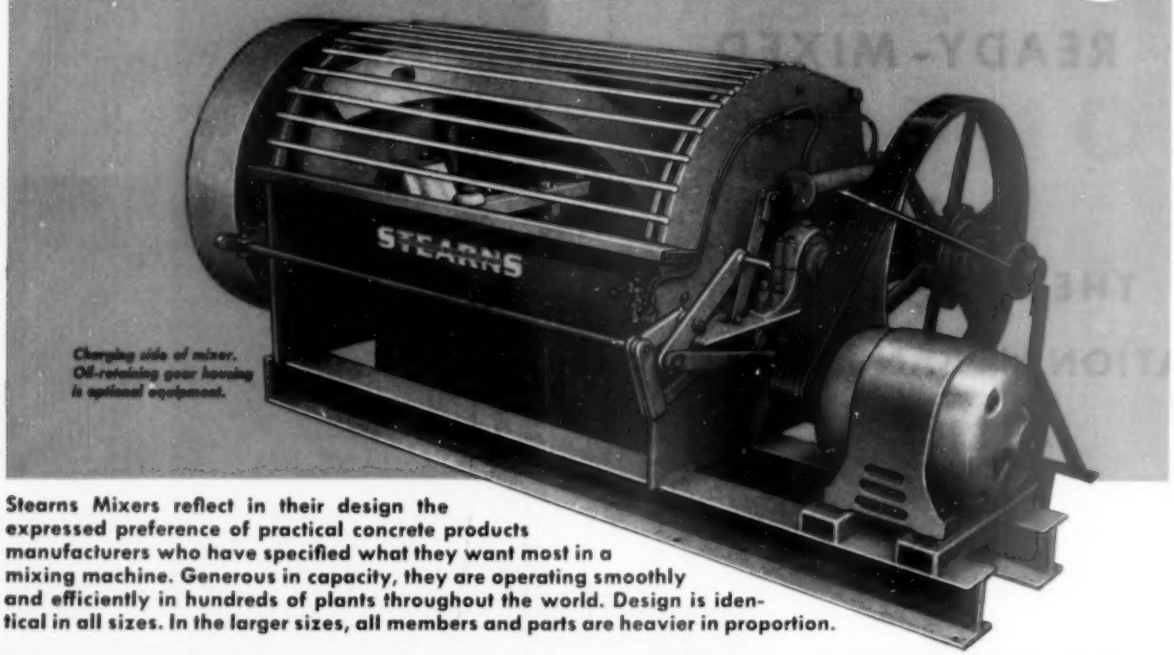
Pozzolith reduces unit water content and conforms with the water-cement ratio law — basis of ACI and ASTM procedures of design, specification and production of quality concrete. *Full information on request.*

the MASTER BUILDERS Co

CLEVELAND 3, OHIO — Subsidiary of American-Marietta Company — TORONTO, ONTARIO

FOR BETTER MIXING AT LOWER COST, USE

STEARNS MIXERS



Charging side of mixer. Oil-retaining gear housing is optional equipment.

Stearns Mixers reflect in their design the expressed preference of practical concrete products manufacturers who have specified what they want most in a mixing machine. Generous in capacity, they are operating smoothly and efficiently in hundreds of plants throughout the world. Design is identical in all sizes. In the larger sizes, all members and parts are heavier in proportion.

DRUM CONSTRUCTION . . . Rolled steel shell is continuously welded to heavy steel drum heads which, with welded foot angles, form a rigid one-piece fabrication.

LINERS . . . Mixer shell is protected by replaceable Ni-Hard sectional liners which give long-lasting life in operation. They are also interchangeable so that those near the bottom which get most wear may be interchanged with those further up on the sides, thus providing much longer life to the set. Drum heads are protected with liner plates, also renewable and interchangeable.

MIXING BLADES . . . The curvature of the mixing blades, their size and weight and their angle of contact with the drum are features that are the result of long scientific research and patient development. The design is such as to give maximum mixing with minimum power. They are adjustable on the arms. They are constructed of Ni-Hard metal which gives them *extra* long life.

BEARINGS . . . Self-aligning, anti-friction bearings are standard equipment on Stearns Mixers. They are fully enclosed for protection against the grit and fine dust encountered in concrete mixing and are designed to take both thrust and radial load.

GEAR-HOUSING—OIL-RETAINING . . . Quiets operation; eliminates wear.

DISCHARGE DOOR . . . The door in the drum, originated by Stearns, is outstanding for its convenience and simplicity. It opens and closes easily and locks in either position without latches or catches. Larger size mixers are equipped with air-operated doors.

CLUTCH PULLEY . . . Bronze bushed pulley. Heavy duty clutches. Note: Clutch control is convenient to operator.

WATER MANIFOLD . . . For even distribution of the water in the mix, a water manifold is provided near the top of the drum.

OPTIONAL EQUIPMENT . . . Any desired custom-built features to meet special needs of individual plants can be added upon request. Consult the Stearns Engineering Division.

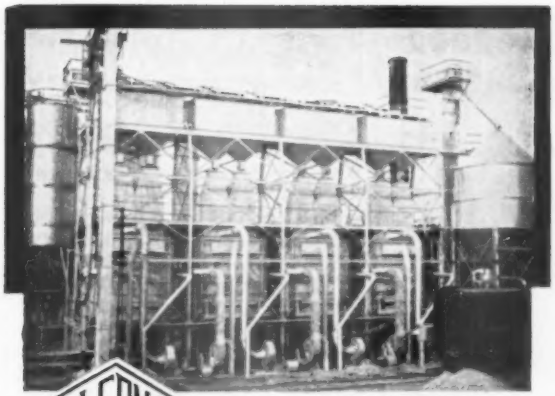
OWNERSHIP—THE KEY TO SUCCESS!

STEARNS

MANUFACTURING COMPANY · INC

ADRIAN • MICHIGAN

ORDER GENUINE STEARNS PARTS FOR GUARANTEED PERFORMANCE IN OPERATION



ELLERNAN

4 UNIT INSTALLATION

CALCINER

For Burning LIMESTONE, DOLOMITE, etc.

PREHEATS - CALCINES - COOLS

AUTOMATIC CONTINUOUS OPERATION

MINIMUM FUEL CONSUMPTION

There are extra dividends available in the operation of your plant when you use Ellernan Calciners . . . let us explain the exclusive features . . . write today for literature and detailed information applicable to your operation.

THE ELLERNAN CO.

Continental Bank Bldg. Salt Lake City, Utah

LOW COST CRUSHING POWER

for fast "secondary breakage"

use FREDERICK CAST semi-steel BALLS

Tough and rugged, Frederick Wrecking Balls deliver crushing power where you need it. They're made to stand abuse—to give you long, economical service. Inverted steel eye gives cable protection plus free-swinging action. Special release hooks for free dropping also available. Shipments made promptly from stock of these sizes: 500 lbs., 1000 lbs., 1500 lbs., 2000 lbs., 3300 lbs., 4000 lbs., 5000 lbs., 6500 lbs., 8000 lbs. (Other weights if requested)

Write today for prices; send order direct or phone us now.

FREDERICK IRON & STEEL, INC.

FREDERICK *Since 1890* MARYLAND

CENTRIFUGAL PUMPS • MUNICIPAL & GRAY IRON CASTINGS

BLAW-KNOX *TIGHT LIP* BUCKETS

DESIGNED FOR HANDLING

- CEMENT CLINKER
- LIMESTONE
- GYPSUM ROCK

For complete information, construction details and specifications . . . WRITE FOR BULLETIN 2378

BLAW-KNOX Buckets are built especially for low-cost handling of bulk materials in cement plants. Tight fitting lips of cast chrome-nickel-molybdenum alloy steel prevent leakage and resist abrasion to insure long dependable service. Available in a wide selection of capacities and weights to get the most from your crane.

BLAW-KNOX DIVISION

OF BLAW-KNOX COMPANY

2035 Farmers Bank Bldg. • Pittsburgh 22, Pa.

New York • Chicago • Philadelphia • Birmingham • Washington • San Francisco

BLAW-KNOX CLAMSHELL BUCKETS FOR CEMENT PLANTS

SIMPLICITY

WOVEN WIRE SCREENS

- ACCURATE
- DEPENDABLE
- AVAILABLE

Simplicity maintains big stocks of aggregate wire screens, already woven, in an adequate range of openings and a choice of wire gauges . . . edges formed promptly for any type vibrator. Excellent service.

Write for Bulletin No. 66

Simplicity TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND, MICHIGAN

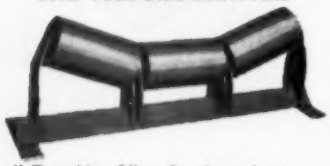
CLASSIFIED ADVERTISEMENTS

Modernize and Economize With Bonded

Conveyors, Conveyor Parts, Belting, Screens, Crushers and Scales

Reduced Prices. Immediate Delivery.

BUILD YOUR OWN CONVEYORS



3-roll Troughing Idlers for these sizes:

14" belt	$16.50	24" belt	$18.75
16" belt	17.25	30" belt	19.50
18" belt	18.00	36" belt	20.25
42" belt	21.00	48" belt	21.75

1-roll Return Idlers for these sizes:

14" belt	$ 6.38	30" belt	$ 8.25
16" belt	6.75	36" belt	8.75
18" belt	7.13	42" belt	9.50
24" belt	7.50	48" belt	10.25

All steel. Interchangeable with other well-known makes. Replaceable ball bearings. Rust-proof ball races; maintenance is negligible.

CONVEYOR BELTING

Famous brands at deep cut prices. New; Fresh Stock.

Width	Ply	Top Cover	Bottom Cover	Duck Carcass	Price
18"	4	1/16"	1/32"	28 oz.	2.50/ft.
24"	4	1/16"	1/32"	28 oz.	3.23/ft.
30"	4	1/16"	1/32"	28 oz.	3.97/ft.
36"	4	1/16"	1/32"	28 oz.	4.70/ft.
48"	4	1/16"	1/32"	28 oz.	6.16/ft.

HEAD AND TAKEUP PULLEYS

All welded steel head and tail pulleys and assemblies complete.
Priced from $60.00

PRICES SLASHED ON

New Troughing Idler Conveyors

We will take our loss on our stock of short length belting and previous model idlers and return rollers in made up conveyors. You can save as much as 50% by buying the BONDED CONVEYOR SPECIALS listed below and accepting your conveyor belting in two pieces. These idlers, belting and conveyor sections are all new. Be dollar wise and take advantage of this saving.

Quantity	List Width	Length of Conveyor	List Price	Sale Price
1	24"	25'	$1322	$ 657
1	24"	45'	2062	1085
1	24"	100'	4097	2037
1	30"	25'	1421	806
1	30"	65'	3101	1583
1	30"	125'	5621	2748

Note: All belting is 4 ply, 28 oz. duck belt with 1/16" top rubber cover and 1/32" bottom cover.

PAN AND RECIPROCATING FEEDERS

Complete with motor and drive. 15 to 225 tons per hour capacity.
Priced from $423.00

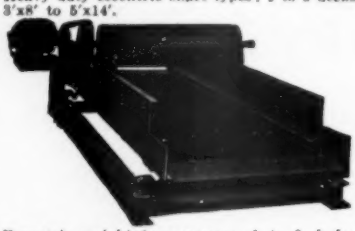
CLOSING OUT, New D.C. Motors; 230 volt

H.P.	Winding	RPM	List Price	Sale Price
3	Comp. & Shunt	1750	$276.19	$100.00
5	Shunt	1750	438.95	165.00
7½	Comp.	1750	530.19	195.00
*7½	Comp.	1200	700.00	225.00
15	Comp.	1150	937.00	380.00

*This is a Marine type motor with shaft on both ends.

VIBRATING SCREENS

Heavy duty eccentric shaft types: 1 to 5 decks, 3'x8' to 5'x14'.



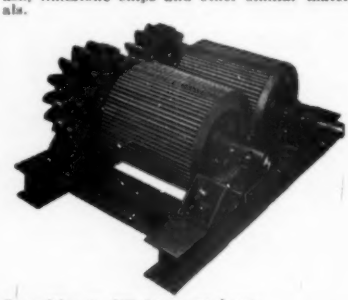
Eccentric weight type screens, 1 to 3 decks; sizes to 3' x 8'. Including cloth or plates.
Priced from $431.00

TRUCK SCALES

20 Ton Truck Scales	$525.00
26 Ton Truck Scales	582.00
33 Ton Truck Scales	895.00

CINDER, PUMICE, PERLITE CRUSHERS

For crushing cinders, pumice, perlite, volcano ash, limestone chips and other similar materials.



Capacities to 100 tons per hour.
Priced from $479.00
including steel hopper.

BONDED SCALE & MACHINE COMPANY

128 Bellview — Columbus 7, Ohio

PHONES: GArfield 2186, FRanklin 6-8898, Evenings.

WE BUY AND SELL

BROOKS LOAD-LUGGERS

AVAILABLE: Model CH 300. Mounted on 1950 Chevrolet. Like new
WANTED FOR CASH: Model CH Loadluggers and Buckets in all sizes

SPECIAL ITEMS WHILE THEY LAST

Bradley Wash Fountain, 54 inches in diameter with soap dispenser.
Barrett Lift Trucks—Model J-K-9-11-42. Each $75.00
Lewis Shepard Hydr. Lift Trucks—3500# Cap.—Type WHE—Mod. 1142. Each $145.00
Dings Magnetic Separator with 18" Conveyor, complete with controls, etc.

GENERAL TRADERS, Inc.

2675 Grand Avenue — Chicago 12, Illinois

CRUSHERS: Gyratory 30", 36", 42", and 48". Nos. 12, 10, 9, 7½, 6, 5 Allis-Chal. and others.
JAW TYPE: 24x36, 25x40, 28x36, 40x48, etc.
CONE TYPE: Symons 2, 3, 4 and 5½'. No. 36 Telsmith. Also Kennedy 19, 25, 37 and 49. Traylor 1'8" and 2'4" TY. Newhouse 7, 10 and 14". Steadman 24, 30 and 36" Impact. Allis-Chalmers Ty. R.
ROLLS: Allis-Chal. 72x30, 54x24, 54x20, 40x15 and 18x10. Pioneer 18x30. Universal 16x24. New Holland 24x16 and 16x16. McLanahan 18x24 and 18x30.
HAMMERMILLS: Williams Nos. 2, 3, 4 and 6. Day Nos. 40 and 70. Gruendler 2XB and 3XB. Dixie 2040, 3650 and 5040, and others.
MILLS: Hardinge 3'x8", 6'x22", 6'x3' and 8'x4'. Kennedy 4x8, 5x6, 5x11. Marcy 4x5, 6x4, 7x16. Raymonds, Sturtevants and others.
CRUSHING PLANTS: 24x36, 25x40, 30x42 and smaller. Also complete stationary plants.
DRYERS: 90"x60', 7'x50', 10'x90', 8'x50'. Etc.
SCREENING PLANT: Large modern plant new in 1946, priced at ⅓ original cost.
DRAGLINES: Page 8 yd. 160' Bm.; Page 6 yd. 125' Bm.; 5W Monighan 5 and 7 Yd. 125'.
BINS & BATCHERS: 20 yd. capacity & larger.

MISCELLANEOUS ITEMS

Barges, Bins, Buckets, Boilers, Cableways, Cars, Compressors, Conveyors, Cranes, Dryer, Derricks, Draglines, Drag Scrapers, Dredges, Drills, Engines, Elevators, Excavators, Generators, Hoists, Kiln, Locomotives, Loaders, Motors, Pipe, Pumps, Rail, Scales, Screens, Slacklines, Shovels, Tanks, Trucks, Tractors, Etc., in many sizes, types and makes at low prices. **(I have equipment at many points in the United States and Canada. What you need may be near your plant.)**

MARIETTA — ALEX T. McLEOD — KANSAS

SPRING CLEARANCE

Material Loaders

Hough "HL" 1-Yd. Payloader, Gravity Dump. Reconditioned @ $3000.
Haiss "T7C" Crawler Bucket Loader. Reconditioned.
Cletrac "DGH" Gas Tractor w/Drott Hyd. Loader, 1100 hours. Like new.
Cletrac "DDH" Diesel Tractor w/Drott Hi-Lift Front End Loader, 1½ yd. Bucket @ $4250.

Transit Mixers

Smith 3 yd. Hi-Discharge Mixer w/White Truck.
Rex 2 yd. Hi-Discharge Mixer w/Ford Truck @ $1500.
Rex 2 yd. Hi-Discharge Mixer w/Chevrolet Truck.

Cranes & Shovels

Speeder "B-3" ½ yd. Dragline @ $2500.
Koehring "301" ¾ yd. Gas Dragline, 45' Boom, Fairlead. Cheap.
Osgood "200" ½ yd. Dragline. Reasonable.
Link-Belt "UC-55" ½ yd. Dragline or Hoe, self-propelled, rubber-tired unit.
Sargent "38" ⅜ yd. Trench Hoe, mounted GMC 6x6. Demonstrator. Discount.
Schield Bantam "47" Hoe-Dragline-Shovel, mounted '47 Chev. Tandem with Outriggers.

Miscellaneous

IHC "T-9" Gas Tractor w/Heil Cable Dozer. Reconditioned.
Trailer Tag-A-Long, 9.00x20 tires (8-ton) @ $450.
Cedarapids Portable Primary Plant on Pneumatics w/1524 Jaw Crusher, 24" x 6'0" Apron Feeder, gas power, 30" discharge conveyor, etc.

EIGHMY EQUIPMENT COMPANY
Rockford, Illinois

DON'T MISS THIS ONE

If You're Looking For Euclids

2—9 Yard Bottom Dumps $3000.00 each.

22—13 Yard Bottom Dumps.

1—7BV Euclid Loader.

1—8TDT-14SH Single Engine Scraper.

1—68FDT-17SH Twin Engine Scraper.

1—HD-19 Allis Chalmers Tractor.

Prices on Request.

All Units From Our Rental Fleet Ready To Start Paying-off Now

Wire Collect For Details

W. H. ANDERSON CO., INC.

47 W. 7 Mile Road — Detroit 3, Mich.

Forest 6-1000

FOR SALE

Universal 2½ Ton Diesel Locomotive. 24" gage. Exhaust Gas Conditioner. Ready to go.

UNIVERSAL DREDGE MFG. CO.
124 Waxee Market, Denver, Colorado

ALSO SEE READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT CLASSIFIED ADVERTISING IN CONCRETE PRODUCTS SECTION

"HARD-TO-FIND" EQUIPMENT

CLASSIFIER—Dorr, Type DSFH.
CONVEYOR—Apron, 34', cc. 36".
CONVEYOR—Belt, 375', cc. 18".
(Other conveyors in stock. Send us your requirements.)
CRUSHER—Jaw, 18" x 36".
CRUSHER—Gruendler 3XC.
ELEVATORS—Bucket, all sizes.
MAGNETIC BELTS—7'5" cc, 30".
MAGNETIC SEPARATOR — 30" three roll.
MILL—Raymond, 5 roll, high side.
MILL—Pug, 23" x 12' double shaft.
MIXER—Double Shaft, Paddle, 4' x 20' UNUSED.
SCREEN—Vibrating, 4' x 7'.

KILNS—COOLERS—DRYERS

8'x80'x¾" Vulcan.
7'x160'x⅝" (2).
7'x120'x⅝" (2).
7'x60'x⅜" with lifters.
610-24 Sta. Steel Roto-Louvre.
502-20 Roto-Louvre.
310-16 Roto-Louvre.
5'x67'x$\frac{5}{16}$".
5'x30'x⅜" Ruggles-Cole.
4'6"x50'x¼" with lifters.
4'6"x40'x⅜" Traylor.
4'x35'x½" with burner.

Write for Our Catalog

HEAT & POWER CO., INC.
70 PINE ST., NEW YORK 5
Hanover 2-4890
Machinery & Equipment Merchants

FOR SALE

1—¾ yd. P&H Shovel, Model 150, Ser. No. 5347, new motor.
1—Feeder Charging Hopper, 20 yd. cap.
1—Reciprocating Feeder 18 x 30, 5 H.P. Elec. Motor.
1—Acme Primary Crusher 18 x 40, 75 H.P. Elec. Motor.
1—30"x50' Primary Conveyor, 5 H.P. Elec. Motor.
1—3'x20' Cedar Rapids Washbox, 5 H.P. Elec. Motor.
1—Acme Reduction Crusher 10x40, 45 H.P. Elec. Motor.
1—Acme Revolving Scalper Screen 5x24, 7½ H.P. Elec. Motor.
1—Return Conveyor 50' centers, 20" belt, 5 H.P. Elec. Motor.
1—Steel Bin used for sand storage, 50 tons capacity.
1—Sand Conveyor 50' centers, 18" belt, 5 H.P. Elec. Motor.
1—Long Conveyor, 100' centers, 24" belt, 5 H.P. Elec. Motor.
1—Final Rotary Grading Screen 5'x24', 5 H.P. Elec. Motor.
1—Steel and Wooden Bin, 250 tons capacity.
Power House with large elec. panel and extra starting switches for the large motors.
1—Worthington Centrifugal Pump, 6" intake, 5" discharge, capacity 500 g.p.m.
500 ft. 5" Water pipe.
500 ft. 4" Water pipe.
500 ft. 3" Water pipe.
1—Stedman 30" Cage Disintegrator, 35 H. P. Elec. Motor.
2—Dump trucks for plant work (not licensed).
1—Ford Dump Truck, 1944.
1—Michigan Crane Serial No. T6K5454, 25' boom, ⅝ yd. bucket, Hercules Motor.
1—Gould Centrifugal Pump, 4" intake, 3" outlet, 5 H.P. Electric Motor.
1—Good Roads #6 Champion Jaw Crusher, 12x24, (good shape but not in use).
1—Lidgerwood Double Drum Dragline Hoist, 60 H.P. Elec. Motor. Supposed to be able to handle 1 cu. yd. bucket. Mounted on heavy truck chassis.
1—T-20 International Bulldozer.

THE PAINTED POST SAND & GRAVEL CO.
PAINTED POST, NEW YORK

BUY WITH CONFIDENCE FROM A LONG ESTABLISHED COMPANY

With AAA-1 Rating

Our 36th Year

ROTARY KILNS:

2—7' x 60' Calciners, made by Struthers Wells. Each 9/16" shell, Timken roller bearing supports, L-B gear reducer, with V-belted AC motor, firing hood, seal ring, one with Manitowoc Recuperator, in excellent condition.
1—6'6" I.D. x 12' Rotary Nodulizer or Furnace, ⅝" shell, Timken roller bearing rolls, gear reducer and motor drive, scraper conveyor, feeder, etc.

ROTARY DRYERS:

1—8' x 54' Struthers-Wells, Timken roller bearing supports, gear reducer, 40 H.P. motor, furnace, burner, etc.
8—6' x 40', 5' x 40' Ruggles-Coles; 54" x 25' Class Xf-4 Ruggles-Coles, also 3—5' x 50', 5' x 50', 6 x 60', 7 x 70' Direct Heat. Also 3—6' x 50' Louisville Rotary Steam Tube.
6—Link Belt Roto-Louvre Dryers: #207-10 (2'x7"x10"), #310-16, #508-10, #604-20, two #604-24.
3—3'x50' Rotary D.H. Dryers or Coolers.

CRUSHERS:

Jaw—2 x 6", 6 x 15" Sturtevant; 18 x 36" and 24 x 36" Farrel; 42 x 48" Traylor; Rolls: 42" x 16" Allis-Chalmers Type B; 24 x 32" Penna. single roll. Portable Plants—Cedar Rapids 1036-BBB; 2540-AAAA, 2036-AAA, also Pioneer with 30 x 42" primary and secondary crushers, all Diesel driven.

PULVERIZERS:

1—5 roll Raymond High Side.
6—#1, #0, #00, #000 Raymond Mills.
3—#0, #00, 8" Raymond Screen Mills.
2—#51 Raymond Imp Mills.
2—Mikro #2TH, #4TH.

BALL AND TUBE MILLS:

6—Hardinge Mills, 3' x 8", 5' x 22", 6' x 22", 8' x 48".
4—Tube Grinding Mills, made by Traylor E. & M. Co., Allentown, Pa. Silex lined, 4' x 13', 4'6" x 18'6", 5' x 22' and 5' x 20'. Also 2—5'6" x 20' iron lined, with motors.
8—Pebble Mills, porcelain lined; 3—6' dia. x 8', 800 gals. each. 1—6' x 5', 3—5' x 4', each with ball charge.

AIR SEPARATORS:

2—Raymond 6' and 16' dia.; 1—8' Gayco; 1—16' Sturtevant.

VIBRATING SCREENS:

3—Selectro 3' x 8' 2-deck; 1—3' x 8', 1-deck, all totally enclosed, heavy duty.
1—3' x 6' Colorado Iron Works, 1-deck.
2—4' x 10' Tyler Niagara, 2-decks.
8—Tyler Hummer, 3' x 5', 4' x 5', 4' x 10'. Also #38 4' x 10'.

DORR CLASSIFIERS:

2—2 stage Washing Classifiers, each with two rakes in tandem, in steel trough 26'6" long x 3' wide, with drives.
1—6' x 14' Hardinge Rotary Counter Current Classifier, also used for dewatering and scrubbing.

Also Shovels, Cranes, Draglines; Jaw, Gyratory and other Crushers; Symons and Telsmith Cones; Complete Portable Crushing Plants; Rotary Kilns and Coolers; Air Compressors; Conveyors; AND FULL LINE OF CHEMICAL PROCESS EQUIPMENT.

CONSOLIDATED PRODUCTS COMPANY, INC.
15-16-17 Park Row, New York 38, N. Y.
BArclay 7-0600

28 SURPLUS NEW BELT CONVEYORS

24 INCH—1-1100' Long.
36 INCH 1-160'—2-250'—1-320'—1-400'—1-590'—2-1000' & 1-1600' Long.
42 INCH 1-144'—1-290'—1-377'—1-575'—2-700'—1-800'—2-1500' Long.
60 INCH 1-85'—1-500' Long.
EXTRA IDLERS, TERMINALS & BELTS

10 SURPLUS NEW MERRICK E WEIGHTOMETERS

For 18-24-30-36-42 inch Belt.

CLYDE HYDRATOR WITH KUNTZ CONTINUOUS DUSTLESS SYSTEM, 4-5 T.P.H.
NO. 1 RAYMOND AUTO PULVERIZER WITH THROWOUT, SEPARATOR & CYCLONE
KUNTZ 5 x 20 CONTINUOUS HYDRATOR
NO. 4 CLYDE BATCH HYDRATOR.
3 ROLL BRADLEY HERCULES JR. PULVERIZER.

ROTARY KILNS OR DRYERS

1—4'x20', 2—4'x45', 1—4'x60'
1—6'x60', 2—5½'x7'x60', 1—8'x80'.

LOCOMOTIVES

9—4 TON AND 8 TON GOODMAN, 36 IN. GAUGE BATTERY LOCOMOTIVES
65 TON G.E. DIESEL ELEC.
10 TON DAVENPORT GAS.
20 TON WHITCOMB GAS.
6 TON BROOKVILLE DIESEL.
2 100 TON G.E. DIESEL ELEC.
4 TON BROOKVILLE GAS.

LOCOMOTIVE CRANES

30 TON INDUSTRIAL GAS.
20 TON ORTON GASOLENE.
25 TON INDUSTRIAL STEAM.

CRUSHERS

48 x 60 SUPERIOR JAW CRUSHER.
24 x 36 FARRELL JAW CRUSHER.
42 x 48 SUPERIOR JAW CRUSHER.
18 x 36 FARRELL JAW CRUSHER.
530R ALLIS CHALMERS FINE REDUCTION
3 FT. TY TRAYLOR FINE REDUCTION.
HAMMERMILLS, ALL SIZES

MODERN ELEC. AIR COMPRESSORS

1760 FT. INGERSOLL RAND PRE-2, 2300 V.
1302 FT. SULLIVAN WN-31, 220 V.
1302 FT. INGERSOLL RAND, 2300 V.
690 FT. WORTHINGTON, 220 V.

BLAST HOLE DRILLS

5—B. E. 29T ELECTRIC.
1—BUCYRUS ARMSTRONG 12 BIT DRESSER.
2—I. R. DIESEL QUARRYMASTER.

THE DARIEN CORP.
60 E. 42nd St., N. Y. 17, N.Y.

Quarry Equipment

2036 Cedarapids AAA portable primary, diesel power.
1036/2418 Cedarapids Jr. Tandem on rubber.
Cedarapids Rock-It plant w/2025 jaw, 3033 hammermill.
1236 Cedarapids Model 6C plant. New.
4033 Cedarapids Model 6C plant. New.
2020 Cedarapids double impeller. New condition.
4024 Cedarapids roll. Rebuilt.
3018 Cedarapids roll. Rebuilt.
1236 Cedarapids twin jaw crusher. New.
1036 Cedarapids jaw.
1036 Telsmith Wheeling.
10x7 Allis-Chalmers Blake type jaw crusher. Rebuilt.
#1 Cedarapids Kubit impact breaker. New condition.
B-3 Jeffery swing hammer pulverizer. Rebuilt.
60" dia. x 14' Traylor revolving screen. Rebuilt.
36" Wemco single pitch sand screw. New condition.
15 cu. yd. Cedarapids sand drag. New.
16"x90' bucket elevator.
60-ton, 2-comp., 8'x18' storage bin w/clam gates.
Special bins to your specifications.
Conveyors—18"—24"—30"—36". Also belt.

SHOVELS AND CRANES

Lorain L-82, 2-yd. diesel.
Lorain 77, 1½-yd. diesel.
Lorain 75B, 1¼-yd. diesel.
Lorain L-50-1, 1-yd. diesel.
Lorain 40 truck crane on Mack 3-axle truck.
Unit 514, ½-yd. gasoline crawler shovel, rebuilt.
Lorain 30A, ¼-yd. gas combination.

WELL DRILLS & TOOLS

Sanderson-Cyclone No. 42 well drill, new.
Sanderson-Cyclone No. 44 well drill, new.
1952 Model 40 Keystone w/truck & tools.
Used Model 42 Sanderson-Cyclone well drill on Dodge truck.

TRUCKS

27FD rear dump Euclids.

AIR COMPRESSORS

500 cu. ft. Gardner-Denver diesel, rebuilt.
365 cu. ft. Gardner-Denver. New condition.
105 cu. ft. Schramm gas powered on 4 steel wheels.
Worthington 2-stage, water-cooled, vertical 250#, 60 CFM, new condition.

L. B. SMITH, INC.
CAMP HILL, PA.
Phone Harrisburg 7-3431

CLASSIFIERS: 4—Akins and 4—Wemco 54"x34', Simplex, double pitch, type S, with 220/440 volt, syncrogear motor and lifting device. Four located in Nevada.

SINK FLOAT MILL: Wemco Sink Float Mobile Mill, capacity 360 tons per day, condition like new.

PORTABLE CRUSHING PLANT: Cedar Rapids 2 unit Plant, 40 tons per hour, used only four months.

KILNS: 2—7'6"x125 ft. complete, with or without Fuller grate type Coolers. 1—8'x80 ft.

PULVERIZERS: Hardinge steel lined conical Ball Mills complete with motors and auxiliary equipment for dry grinding, sizes 5'x22", 10'x36", and 10'x48".

LOCOMOTIVE CRANE: 25 ton capacity, thoroughly modern, gasoline powered, cast steel trucks, air brakes, with or without 1¼ yd. clam shell bucket. For sale or rent. Located Minnesota.

COMPRESSOR: Worthington DC2, 29/18½x21, motor 600 H.P., synchronous, 440 volt, with all auxiliary equipment.

MINE HOISTS: Single and double drum 100 to 1500 H.P. with all electrical equipment. Complete specifications, drawings and photos available.

DIESEL MOTOR: Caterpillar D13000 portable on skids, 122 H.P.

WE BUY AND SELL EQUIPMENT THROUGHOUT NORTH AND CENTRAL AMERICA

A. J. O'NEILL
Lansdowne, Pa.
Phila. Phones: MAdison 3-8300—3-8301

Euclid Trucks 15 Ton—22 Ton End Dump—15 Yd. and 25 Yd. Bottom Dumps—12—25 Yd. Bot.-Dump without tractors.

4—Elec. Std. Ga. Dump Car locomotives—600 volt with 17—std. ga. air dump cars—25,000 lb. cap. 130 Cu. Ft. level, with all elec. equip. Goodman 10 Ton Mine Loco.—250 Volt 36" Gauge. Ottumwa Mine Hoist—1¼" Rope—200 H.P. Motor—525 R.P.M. complete.

Jaw Crushers 36" x 48" Nordberg—36" x 48" Farrel—60" x 48"—42" x 48"—42" x 30"—24" x 36"—10" x 36"—12" x 36" Symons Cone 5½'—4'—3'—2'—50 x 40 Dixie hammer mill—54" Traylor Type T—42" McCully—48" Gyrosphere.

Shovels—Roll Crushers—Rod Mills—Ball Mills—Rotary Kilns—Dryers—Log Washers—Classifiers—Mine Hoists—Transformers—Motors—Gravel Plants—Blast Hole Drills—27T—20T—42T—Generator sets—Drag Lines. 2—25' A.C. Log Washers.

STANLEY B. TROYER
Theatre Bldg. Tel. 500 Crosby, Minnesota

FOR SALE

1 William #20 Slugger type Crusher, built 1946. Never been used. Price $2,950.00 on board cars, Austin, Texas.

1 20 ton Insley stiff leg all steel derrick. 32'6" mast, 80'0" boom. With steel bull-wheel turner. Condition excellent. Price $3,750.00 on board cars Austin, Texas. Now erected and subject to inspection at Austin.

2 I International Diesel Tractors TD14 with 14'0" front end mounted booms. Serial Nos. TD-F 3447-T-4 and TD-F 5713-T-4. One presently located in Carrollton, Texas, and other in Austin, Texas. Price $6,250.00 each on board cars.

For additional information write:
STONE BUILDING PRODUCTS, INC.
P. O. Box 412, Austin, Texas

---

7 - SLIGHTLY USED - 7 TRUCKS and MIXERS

4½ YARD JAEGER MIXERS, MOUNTED ON 1950 FORD 2½ TON—10 WHEEL TRUCKS. THESE UNITS HAVE TRAVELED ONLY 25,000 MILES APPROXIMATELY AND HAVE POURED ONLY ABOUT 10,000 YARDS OF CONCRETE.

ALL HAVE RECENTLY BEEN THROUGH OUR SHOP FOR ANNUAL OVERHAUL.

PRICE—$7500.00 EACH—PRICE

SOUTHERN MATERIALS COMPANY, INC.
Box 1J, Richmond 1, Virginia
Phone: 3-3451

PIPE—Small and Large Diameter, from our Stock

Welded
Seamless
Corrugated

Supplies of Fittings
Valves and Tube Turns
Power Piping Fabrication
SPEED-LAY Pipe System
Quick Assembly
Economical, Light Weight
Write for Brochure

ALBERT
PIPE SUPPLY CO., INC.

Berry at North 13th Sts., Brooklyn 11, N. Y.
Phone EVergreen 7-8100

FOR SALE

1—Acme #8½A Jaw Crusher, 9x16, 20 HP motor
1—Hardinge Conical Ball Mill 4'6" dia. x 24"
2—Williams #1 Hammer Mills
1—Rotary Hot Air Dryer 46" dia. x 26' L
13—15,200 gal. Horiz. Welded Steel Tanks (Virginia)
12—12,700 gal. Horiz. Welded Steel Tanks (Indiana)
22—8,300 gal. Open top Rectang. Welded Steel Tanks 16'10" L x 7'7" W x 8'9" H. (Indiana)

PERRY EQUIPMENT CORP.
1418 N. 6th Street, Phila. 22, Pa.

FOR SALE

ROTARY KILN, 7' x 45', ⅝" SHELL, LINK-BELT, LIKE NEW CONDITION.

ROTARY DRYER, 5½' x 35', ¼" SHELL.

R. E. MANLEY
1050 Ogden Dunes, Gary, Indiana
Phone: Ogden Dunes 3820

1—9" x 15"—#4 Champion Jaw Crusher—Rebuilt.

1—6" x 9" New Holland Jaw Crusher.

1—20" x 10" New Holland Swing Hammer Pulverizer.

1—Kent-Maxecon #7 Ball Bearing Ring Roll Mill & Vee Belt Drive.

We build open & totally enclosed bucket elevators & belt conveyors to suit your needs.

Large stock chain, sprockets, buckets & conveyor pulleys—new & used.

JOHNSON & HOEHLER, INC.
P. O. Box 102 Lansdowne, Pa.

FOR SALE

2—EUCLID, Model 9 FDT Tractors with 58 W Bottom Dump Trailers — CUMMINS DIESELS, Excellent Condition, and Excellent Rubber.

WINTER BROTHERS MATERIAL CO., INC.
VI 3-4052 Sappington 23, Missouri

CRUSHERS: 10x20 Rogers, 10x30 Champion, 15x36 Gruendler, 18x36 & 20x36 CR, 24x36 Farrell, 24x50 Champion, 30x42 Univ., 48x36 Farrell, 42x48 Traylor JAW, #19, 25 & 37 Kennedy, 13B, 16B & 20A Telsmith, 7 & 10' Newhouse GYR. 2' Symons std. & shorthead Cone.
5x24, 54"x30, 6x25 & 6x50' Rotary DRYERS.
MILLS: Williams Comet & Raymond 4 roll high side. 4½x24" Hardinge Ball. 8" & 10" Dredges.
DRAGLINES: Insley K12, Koehring 304, Lorain L41, P&H 455A, 1055LC, Lorain 820.
SHOVELS: Bay City 25, Buckeye 70, Link Belt LS75, NW25 & 6, Marion 7, Lorain 77, Bucyrus 75B, Lima 802 & 1201.
Dwight Lloyd Sintering Machine 42"x40'.
20 ton Brownhoist, 25 ton McMyler Loco Cranes.
5 ton Robbins and Myers OET Crane, 28½' span.
LOCO: 45 ton Diesel Elec. 83 ton Steam Switcher, std. ga.

MID-CONTINENT EQUIPMENT CO. INC.
8321 Gannon, St. Louis 24, Mo. Wydown 2826

FOR SALE
10" SUCTION DREDGE

40' x 24' Steel Boat
10" Amsco Pump
V-Rope Drive Powered by 2-120 HP Cummins Diesels in Tandem
12" x 25' Suction
100'—10" Pipe
8—Pipe Pontoons
Motors in good condition.
Parts to make practically new pump.
Dredge used in sand deposit located on railroad near Cowles, Nebr.
Sale Price—$8,000
Contact—
G. C. McBRIDE CO.
P.O. Box 500, Brownwood, Texas
Phone 5955

FOR SALE

30 ton Industrial Brownhoist Loco. Crane. 150 HP Climax gas engine. 70' bm. 8 wheel. Double drums. Reconditioned.

65 ton Gen. Elec. diesel-elect. switching locomotive. 400 HP Cummins engines. 0-4-4-0. New 1943. Completely rebuilt.

1½ yd. Koehring 605 diesel crane, like new. GM 6-71 Diesel. 140' bm. Long tracks. Tagline. 4 yrs. old. Bargain.

Mississippi Valley Equipment Co.
513 Locust St. St. Louis 1, Missouri

1—No. 1 Raymond Mill.
Nos. 9, 8, 7½ and 6K Allis-Chalmers gyratory crushers.
1—6' Raymond Whizzer separator.
1—42"x16", 36"x16", and 24"x12" crushing rolls.
1—Complete lime hydrating plant.
1—42"x48", 24"x36", 18"x36" jaw crushers.
1—1200 or 1500 bbl. cement plant.
14", 16" McCully Superior Gyratory Crusher.
5' x 50' x ½" dryer. 1—8' x 80' kiln.
New and Rebuilt Dryers—Kilns and Coolers

W. P. HEINEKEN, INC.
50 Broad St., N. Y. Tel. Wh. 4-4236

RAILS NEW AND RELAYING
TRACK ACCESSORIES
"FASTER FROM FOSTER"
Try us for all of your rail needs. We're buying daily — replenishing our stocks in all sizes. Complete stocks of All Track Tools & Accessories.

PIPE ✔ PILING ✔ WIRE ROPE & SLINGS
L B FOSTER CO.
Pittsburgh 30, Pa. New York 7, N.Y.
Chicago 4, Ill. Ha[illegible] 2, T[illegible]

ALSO SEE READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT CLASSIFIED ADVERTISING IN CONCRETE PRODUCTS SECTION

FOR SALE

ENGINE POWER UNIT MD-6 MURPHY DIESEL 150 HP.

ENGINE POWER UNIT LAE CASE GASOLINE 60 HP.

ENGINE TM681A MINNEAPOLIS-MOLINE GASOLINE 8 x 9 135 HP.

G. & W. H. CORSON, INC.
PLYMOUTH MEETING, PA.

FOR SALE

ONE SYNTRO-PAC FULLY AUTOMATIC 2 BLOCK PLAIN PALLET BLOCK MACHINE, INCLUDING 2 PALLET OFF-BEARER, AIR COMPRESSOR, 5 NEW MOLD ASSEMBLIES AND LOT OF REPLACEMENT PARTS. THIS MACHINE'S RECORDED AVERAGE PRODUCTION RECORD FOR THE MONTH OF MARCH WAS 415 BLOCKS PER HOUR.

ONE 21 CU. FT. "MASTER BUILT" MIXER WITH NEW LINERS AND BLADES AND LOT OF REPLACEMENT PARTS.

ONE SKIPHOIST COMPLETE WITH REPLACEMENT PARTS.

W. K. BRYANT, Strasburg, Virginia

FOR SALE

One Sauerman two drum hoist with 75 H.P., G.E. motor and all electrical equipment for $2200 F.O.B. our plant.

MEADVILLE SUPPLY CO.,
Meadville, Pa.

A GOOD BUY!!!

Jackson-Church CPX 6 pocket brick machine. Kent continuous mixer, Syntron Vibrator Feeder. Excellent Condition.

D. A. HOWE SONS, INC.
300 Southwest Cutoff, Worcester 7, Mass.
Telephone: 2-1276

FOR SALE

One ¾ yd. LS 85 Link Belt trench-hoe attachment. Excellent condition.
One ½ yd. truck crane with all attachments. Excellent condition.
One ⅝ yd. Byers shovel. Fair condition.

AMENIA SAND & GRAVEL CO.
Amenia, N. Y. Phone 351

FOR SALE

ONE STEARNS CLIPPER STRIPPER AND PALLETS IN VERY GOOD CONDITION. PRICED FOR QUICK SALE.

W. K. BRYANT, Strasburg, Virginia

SALE OR RENT

1—675 CFM Chi-Pneumatic 125 HP Compressor.
1—3/5 ton Huber Tandem Roller.
1—10-ton Krane Kar Pne. Tires.
1—20-ton Ohio Steam Locomotive Crane.
1—25-ton Ohio Diesel Locomotive Crane.
1—80-D Northwest Shovel, 1949.
1—35-ton P&H 555 Truck Crane.
1—20-ton P&H 255 Truck Crane.

B. M. WEISS CO.
Girard Trust Co. Bldg., Philadelphia 2, Pa.

FOR SALE

1—36" FC Telsmith Gyrasphere Crusher complete with drive and Caterpillar D 13000 Diesel Engine. This machine has been operated 577 hours.

PALMETTO QUARRIES CO.
P. O. Drawer 5185, Columbia, S. C.

Equipment Values!

ENGINE-POWER UNIT—Cat Diesel D17000Y, ser. #3S1761. Heavy duty V8, 190 HP Diesel engine. Looks and runs right. Just serviced, and ready for work, F.O.B. Paducah, Ky. $5,380.00

AIR COMPRESSOR—Gardner-Denver 500 cu. ft. ser. #4S10567, powered by Cat Diesel engine; 2 years old; hourmeter 3598. A-1 condition. F.O.B. Louisville $7,930.00

CONVEYOR—Northern Mod. B24, belt type, powered by Howell 5 HP elec. motor, mounted on 2 pneumatic tires. 3-roller type idlers. General purpose conveyor is brand new and sold at exactly our cost. F.O.B. Louisville $1,601.00

AIR COMPRESSOR—Gardner-Denver 105, powered by Buda gasoline engine, mounted on 2 pneumatic tires. This good-looking machine just out of our rental stock. F.O.B. Louisville $2,250.00

TRACTOR-DOZER—Caterpillar Diesel D6, ser. #5R4515, standard gauge, with LaPlant-Choate hyd. angledozer. Cat Diesel engine completely overhauled about 500 hours ago. F.O.B. Paducah $5,080.00

MOTOR GRADER—Caterpillar Diesel No. 12, ser. #9K4616. Tandem 75 HP grader, leaning front wheels, 12 ft. moldboard, scarifier less teeth. Excellent performance and appearance. Giveaway priced! F.O.B. Louisville $4,788.00

ROY C.
WHAYNE
SUPPLY CO.
800 W. MAIN ST., LOUISVILLE, KY.
EVANSVILLE, IND. PADUCAH, KY. ASHLAND, KY.

PRICED FOR QUICK SALE

One—Two Block Praschak Vibrator
8", 10" and 12" Mold Boxes
64 Steel Racks.
1,000 12" pallets
1,000 10" pallets
1,000 8" pallets
400 6" pallets
400 4" pallets
250 10" corner pallets
250 12" corner pallets
One—Double Bar Tamper
A—1 Shape
8—10-12 Attachments
Electric Rock Face.

MACHINERY USED ONE SEASON. TERMS

DOUGLAS F. ERDMAN COMPANY
3505 S. Ellen Street, Milwaukee 7, Wis.

FOR SALE

TWO NO. 9 STEARNS JOLTCRETE—COMPLETE WITH ELECTRICAL CONTROL. POWER CARRIAGE AND 4, 6, 8, 12, AND 18 INCH FLOOR FILLER ATTACHMENTS. ALSO INCLUDES 20,000 PALLETS.

W. K. BRYANT, Strasburg, Virginia

CROSSTIES

All kinds & sizes, including treated. Our SPECIALTY — #1's & Rejects Hardwood. Stocks both east & west of Miss. river.

Everything in Southern Lumber

GAY MORRISON
Box 55, Hot Springs, Ark.

ELECTRICAL MACHINERY

Motors and Generators, Control and Repair Parts. Large Stock. New and Rebuilt. Guaranteed Expert Repair Service. Send us your inquiries.

V. M. NUSSBAUM & CO.
Fort Wayne, Indiana

FOR VALUES - BUY BRILL

2—Reeves 7' x 160' x ⅝" Rotary Kilns.
2—Reeves 7' x 120' x ⅝" Rotary Kilns.
1—Vulcan 8' x 80' x ⅝" Rotary Kiln.
1—Ames 6' x 60' x ⅝" Rotary Kiln.
1—Vulcan 5'6" x 25' x ½" Rotary Kiln.
1—NEW Vulcan 8' x 80' x ⅝" Rotary Dryer.
1—Bethlehem 7' x 60' x ⅜" Rotary Dryer.
1—5' x 67' x 5/16" Rotary Dryer.
1—Vulcan 4'6" x 50' x ½" Rotary Dryer.
1—Christy 70" x 40' x ½" indirect Rotary Dryer.
1—Louisville 38' x 20' x 5/16" Rotary Dryer.
1—Hardinge 4½' x 16" steel lined Conical Ball Mill, 30 HP. motor.
1—American 24" x 24" Ring Pulverizer.
1—Redler 7" Drag Conveyor 100' centers.
8—Tyler Hummer Screens 3' x 15', 3' x 10', 3' x 5'.
1—Dixie #3650 Premier Hammer Mill, 100 HP. motor.

SEND FOR DETAILS

Wire—Phone—Write

BRILL EQUIPMENT COMPANY
2401-3 Third Ave., New York 51, N. Y.
Tel: Cypress 2-5703

2 ROTARY KILNS ½ IN. THICK 7' x 5'6" x 60' LONG.

Located in Arkansas

W. H. FRIEND, M. E.
60 E. 42nd St., N. Y. 17, N. Y.

FOR SALE

1—Model "57" Internal Grinder. Good Condition. $300.
1 Hobart, 300 amp. D.C. Welder mounted on 1942 Dodge 4 wheel drive truck, good condition. $1000.

JOE RANARD, BOX 541, ELDON, IOWA

WANTED

20 or 25 ton Truck Crane.
30 ton Diesel Locomotive Crane.
45 ton Diesel Electric Locomotive.

B. M. WEISS CO.
Girard Trust Co. Bldg., Philadelphia 2, Pa.

DEPENDABLE USED MACHINES

Special,—Model 62 Byers ½ yd. combination shovel and dragline. Good shape and priced low.

20x40 portable conveyor	Pioneer 3x14 scrubber screen	Lorain 40 shovel
Pioneer 4x10 screen	Morris 10" manganese gravel pump	Lorain 30 dragline
Eagle cinder crusher	Cedar Rapids 40x20 roll crusher	Bay City 45 dragline
45 ton portable bin	Gruendler 10x36 r.b. jaw crusher	Butler fork truck
Butler carscoop	Robins 20" belt tripper	3 yd. Dumperete

These machines reconditioned in our newly-built daylight plant. Come see them!

10030 Southwest Highway **TRACTOR & EQUIPMENT COMPANY** **Oak Lawn, Ill.**

Special Crushers ! !

Raymond High Side 4 roll Pulverizer, No. 5047
Pennsylvania C-4-30 Reversible Hammermill.
Cedar Rapids 4033 Hammermill. Diesel powered.
Raymond No. 412 bowl pulverizer mill.
FARREL BACON 36" x 48" Jaw Crusher.
Traylor TY 4' with 200 hp. electric motor.

DREDGES

Ellicott 12"x10" new pump with new V-12 385 HP Diesel engine. Port. steel hull.
Ellicott 8" with cutter. Diesel Hull 48'x18'x3'6".
8" Hydraulic. Diesel. On 32'x8' steel pontoons.
Amsco 10" Diesel power portable. Excellent.
6" portable Diesel complete with cutters, etc.
8" H-P twin Diesel drive. Complete.

CONCRETE PLANTS AND EQUIPMENT

3 Koehring 4 yd. tilting mixers complete.
Smith 56-S two yard tilting mixer. Complete.
Port Erie Strayer Concrete Plant 30-40 T.P.H.
Noble CA-104 100 ton 3 Comp. Agg. 400 Bbl. Cement Bin.
Butler 87 Cement Tract Plant 250 bbl. p.h.
Large plant 212 yd 6 compts. agg. & cement elevators, 56-S Mixer.
Butler 250 bbls. cement bin with B-K 100 ton 3 compt. agg.
NEW F-S 100 ton agg. bin 3 compt.
NEW F-S 400 bbl. cement bin complete.

CRUSHING PLANTS

Cedar Rapids Portable Super Tandem, excellent.
Pioneer 40-V. New 1946. Portable. Diesel power
Pioneer WA-300, crushing, washing, screening.
Pioneer Portable Plant with 24 x 36 jaw primary and 40 x 22 triple roll secondary. New. 1950.
Pioneer Secondary Plant. Port. 100 T.P.H. 1¾".

CRUSHERS

JAW: Acme 10x20, 14x36, 14x38, 10x42, 14x32, 18x32, 25x40, Eagle 20x36, Diamond 24x36". Cedar Rapids 10x20, 20x36, 25x40. Farrell 10x20, 13x30, 14x36, 18x36, 36x48. Buchanan 36x42. Good Roads Reliance 15x30. Traylor 18x36, 24x36. Allis-Chalmers 30x18. Good Roads 10x30. Telsmith 18x32. Champion 1620, 1040, 1236, 1530
GYRATORY: Allis-Chalmers-McCully, 6", 7½", 8", 9", 12h, 20", 30", 42", 14", Newhouse, 24", 36"; Gyrasphere, 18", 28". Intercone Telsmith, Telsmith 5H, 10-B, 13-B, 16-B. Kennedy Van Saun 7, 19, 25½-S, 37. Traylor Ty 1'8". Ty 2'4", T-4½".
ROLL: Allis-Chalmers 54x24. Diamond 40x22. Pioneer 30x18. Telsmith 24x16. Pioneer 30"x18". New Holland 24x16.
HAMMERMILL: Size 4 Williams Jumbo, Pennsylvania 8X2, 22x22. Cedar Rapids 20x33. Jeffrey 36x42, Jeffrey 36x24, 36x40. Dixie 3650.
BALL MILL: Hardinge 10'x48", K.V.S. 6'x8' Type M Air swept J-H 6'x6', Hardinge Conical 6'x22". Colorado Iron Works 5'x6'; Marcy No. 64½. Hardinge conical 10'x36".
ROD MILL: March 2'x6', 3'x6'. Allis-Chalmers 4'x8'. Hardinge No. 8 206. Marcy 8'x12'. Hardinge 8'x22".
CONE: Symons 2' coarse bowl, 3' standard head.
TUBE MILL: Smidth 5½x29, K.V.S. 4'x7', Traylor 5'x22'.
DRIERS: Struthers-Wells 7'x84"; others 7'x20', 6'x80', 7'x70', 6'x40' and Cedar Rapids 60"x24'.

SHOVELS—CRANES—DRAGLINES

N-W 80-D 2½ yd. Dragline. Diesel. 100' boom.
N-W Model 6, 1½ yd. Diesel Shovel.
Lima Mod. 34, 1 yd. Shovel-Crane-Dragline. Gas.
Link-Belt K-375 2 yd. Diesel Dragline.
Northwest 80-D Diesel Shovel 2½ yd. Recond.
Link Belt K580 Shovel. 1948—practically new.
Bay City Model 65, 1¼ yd. shovel, diesel. Rebuilt.
Bay City 45 Shovel-Backhoe-Crane. Diesel.
Lima 1301, 2½ yd. Diesel Shovel.
Lorain L86 Shovel. 1⅜ yd. complete overhaul.
Link Belt K-595 dragline, 2½ yd., 8 ft. boom
Lima 802, Shovel-Crane-Drag 2 yd. Diesel.
Koehring 304 Diesel Shovel, ⅝ yd.

SCREENS

Kennedy Van Saun 5' x 16' double deck.
Diamond 4' x 10', three deck.
Kennedy Van Saun 4' x 10', four deck.
Simplicity 5' x 12', double deck.
Reco double deck 4'x14'.
A-C 5'x14' double deck Riple-Flo screen
Tyler Model F-600 TYROCK 5' x 14' double deck.
A-C 5'x14' 2 deck riple-flo.

TRACTORS

2 Cat. D8 Angledozers with DDPCU rebuilt.
Int. TD-18A with B-E Bulldozer.
Int. TD-24 with B-E Cable Bulldozer.
A1-Chal HD19 Angledozer, Hydraulic.
A1-Chal HD7 with Gar Wood angledozer.
Allis-Chal. HD-19 with hydraulic control angledozer.
Cat. D4 Traxcavator with 1 yd. bucket, hydraulic.

LOCOMOTIVES

45 ton G.E. Diesel Elec. Loco. std. ga.
25 ton Plymouth gas loco. std. ga.
Vulcan 20 ton standard gauge type 0-4-0 gas.
20 ton Vulcan gas, std. ga., rebuilt.
25 ton Vulcan steam std. ga. Side tank.
15 ton Whitcomb 36" ga. gas.
Plymouth Model ULDA standard gauge 10 ton diesel.

DERRICKS

American Terry 20 ton Guy Derrick 100' bm
Clyde 30 ton stiff leg 90 ft. boom
Guy Derrick 15 tons 115' mast 105' boom
American 25 ton stiff leg derrick 90' boom.
Special 35 ton stiff leg derrick 100' boom.
Nat'l. Bridge 30 ton Guy Derrick 100 ft.
American 30 ton stiff leg 100' boom.

ASPHALT PLANTS

Butler 100 yd. Bitu. Concrete plant.
Cedarapids 60"x24' asphalt plant drier. Compl
Overmander Monotrole Bit. Mixing Plant, T-34.
Model S-100 Simplicity. Diesel powered.
Hetherington-Berner Moto-Paver
McCarter complete plant 3000# capacity.
Barber Greene 830-840. Complete Plant.
Cummer Semi-Port. 1500#.
Cedar Rapids Travel Roadmix Plant Model 50.

CABLEWAYS

Sauerman slack line 1¼ yd.; electric 90' mast.
Sauerman 1 yd. with 100 hp. electric motor, complete.
Sauerman 1 yd. with Waukesha gas hoist.

RICHARD P. WALSH CO.
30 Church St. New York, N. Y.
Cortland 7-0723 Cable: RICHWALSH

Symons 2 foot short head cone crusher.
Jaw crushers, 7½"x13" and 14"x26".
Gruendler 2XA hammermill, antifriction.
Stedman B-30, hammermill, 30"x24".
Double roll crusher, 24"x14", smooth faces.
Double roll cinder crusher, 12" dia. 18".
Mead Morrison single roll crusher, 24"x30".
Jeffrey single roll crusher, 24"x24".
Robins double roll crusher, 18"x24".
Bonnot double roll crusher, 24"x30".
Pa. SXT-8 hammermill with 125 hp. motor.
Sturtevant Fine crusher 00 with 2 hp. motor.
Hunt double drum Tandem hoist, no motor.
Sullivan single drum 7½ hp. electric hoist.
Ing. Rand double drum 5 hp. electric hoist.
5 overhead electric and air hoists.
40 hp. 115 volts DC motor 3/60/450 volts, 31.3 KVA Alternator.
Motors to 125 hp., gearmotors and reducers.
Gears, Sprockets, Chain, V-belt pulleys.
Single deck 4'x6' vibrating screen.
Simplicity single deck 6'x8' vibr. screen.
Symons 1½ deck 42"x14' vibrating screen.
New Universal Vibrating Screens in stock.
600 two wheel ball bearing trolleys.
Crucible Steel Co. 1¼" steel rock bits.
Pumps, gravity conveyors, bin Gates.
Enclosed and open bucket elevators.
Elevator buckets and elevator chain.
Steel Apron conveyors, 24"x46' and 30"x30'.
Merrick conveyor weight scales for 3" and 16" belt.
Elevator belt 8" to 18" wide.
30", 36" and 42" belt conveyor equipment.
Trough idlers 14", 16", 18" and 24".
Conveyor belt 12" to 36" wide.
Farquhar portable conveyor, 18"x25', Wisconsin engine.
20" and 42" flat belt conveyors.

G. A. UNVERZAGT & SONS
136 Coit St., Irvington, N.J.

JAW CRUSHERS

6" x 3" to 60" x 48"

Before buying or selling any FARREL-BACON JAW CRUSHERS it will pay you to consult

BACON-PIETSCH CO., Inc.
75 No. Maple Ave.—Ri 6-9700
RIDGEWOOD, NEW JERSEY
Engineers and Manufacturers
Machine Shop Facilities
FEEDERS, Conveyors, Screens, etc.
Send for Catalogue

13-B Telsmith Gyratory Crusher.
10-24 Ball Bearing Jaw Crusher.
10-36 Ball Bearing Jaw Crusher.
14" x 26" Acme Jaw Crusher.
10" x 20" Jaw Crusher.
¾ Yr. Byers Shovel, old.
Koehring Gas Dumpster.
100 H.P. Motor.
75 H. P. Motors.
And Smaller Motors.

BLUE BALL MACHINE WORKS
Blue Ball, Pa.

NEW RAILS RELAYERS IN STOCK—PROMPT SHIPMENT

All sections, new and relaying Rails, Angle Bars, Frogs, Switches, Spikes, Bolts and all accessories; cars and locomotives.

Phone *Wire* *Write*

M. K. FRANK
480 Lexington Ave. Park Building
New York City Pittsburgh, Penna.
105 Lake St., Reno, Nevada

CORE DRILLING

--anywhere!

"We look into the earth"
PENNSYLVANIA DRILLING COMPANY
Pittsburgh 20, Pa.

FOR SALE

Superior Diesel Engine, serial # 10716, type ord, bore 8", stroke 9½", 360 H.P., at 720 rpm. Complete with twin disc clutch, oil bath, water-cooled bearing blocks, 14 groove 20" D-belt sheave, heat exchanger and engine oil cooler, and water temperature and oil pressure safety alarm system. Can be seen in operation. Any reasonable offer will be considered.

Herbert Sand Co., Inc., P.O. Box 3, Milltown, N.J.

Wanted Machinery or Plant

Including Rotary Kilns, Direct Heat Dryers, Pulverizers, Crushers, Ball Mills, Vibrating Screens, Power Shovels and Cranes, Bucket Elevators, Conveyors, Filters, Diesel Engines.

P. O. BOX 1351, Church Str. Sta.
New York 8, N. Y.

E. LEE HEIDENREICH JR.

CONSULTING ENGINEERS

Quarries
Crushing Plants
Cement Plants
Storage Methods
Operating Costs

75 Second Street
Newburgh, N. Y.
Phone 1828

9 South Clinton St.
Chicago 6, Ill.
Ph. Franklin 2-4186

Operation
Plant Layout
Design
Appraisals
Construction

ALSO SEE READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT
CLASSIFIED ADVERTISING IN CONCRETE PRODUCTS SECTION

A vital message to the head of the family

Two ways you can protect your family against CANCER

. . . a check
. . . a check-up

Cancer strikes in one of every two families. Each year more than 60,000 American children under the age of eighteen lose a parent to cancer.

Yet many cancers can be cured, if discovered in time.

Every man should have a complete physical examination once a year. Women over thirty-five should have a complete physical examination twice a year.

Because of scientific advances, patients are being cured today who could not have been saved even five years ago.

The American Cancer Society asks your help in the fight against cancer. Your check today will help pay for costly research. Will help keep physicians informed of latest developments in detection and treatment. Will help pay for the training of doctors to specialize in cancer.

How soon we find cancer's cause and cure depends on how soon and how much help comes from people like you.

Invest your money today for your family's security tomorrow.

"Cancer" c/o Postmaster, (Your town)

Please send me free literature about cancer.
Enclosed is my contribution of $_____ to the cancer crusade.

Name_____

Address_____

City_____ State_____

Cancer strikes One in Five
STRIKE BACK . . .
Give to Conquer Cancer

DIRECTOR OF ENGINEERING
Building Materials

A well-known Middle Western manufacturer of structural clay and concrete products wants a man between 35 and 50 to take charge of its development program. Would be responsible for recommending new products to the company, conducting the necessary engineering development work, recommending appropriate facilities and supervising their installation. Would also be responsible for formulating and directing the sales program on new products. Work will be in the structural clay products, lightweight aggregate and precast concrete products fields. Must have good business judgment and an understanding of the construction industry, its problems and the methods and materials it uses. Must be able to sell and to develop and direct sales engineering activities. A good engineering and/or architectural background is necessary and it would be desirable to have considerable knowledge of plant engineering problems. The opportunity is excellent. Would report to the president and, if successful, "may look forward to a general management position." Your reply will be held in confidence.

BOX L-60, ROCK PRODUCTS, 309 W. JACKSON BLVD., CHICAGO 6, ILL.

WORKS ENGINEER

For Midwest Refractory manufacturer. Must be between 35 and 45 years of age, with degree in Engineering, preferably mechanical or electrical.

Actual practical experience in handling men, supervising maintenance and construction work including rotary kilns in stone or refractory plant required. Give details of education, experience, personal qualifications and salary required in first letter. Box L-56, ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Ill.

WANTED

Superintendent for limestone quarry in Illinois. Must be experienced in quarry operation, diesel engines, drilling, blasting, care and maintenance of equipment. Must be able to get full production and be cost conscious. State age, experience, references and salary expected.

BOX L-51, ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Ill.

POSITION WANTED

General Manager wishes to contact principals interested in securing a capable General Manager for a Ready-Mix and/or Building Supply business. 20 years experience in all phases of business. Sales and cost minded. Best references and excellent record of past performance. Salary and Bonus. Assume complete charge. BOX L-59, ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Ill.

CEMENT CHEMIST AVAILABLE

Cement chemist with 20 years experience in the manufacture of all types of Portland Cement including oil well. Thoroughly familiar with wet and dry process in United States and Mexico. Prefer western location, but willing to go elsewhere if inducements are satisfactory. Address replies to: BOX L-53, ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Ill.

HELP WANTED

Superintendent wanted for Modern Rock and Sand Plant in Los Angeles Area. Give full data on physical condition, age, experience, references and salary requirements.

CITY ROCK COMPANY
P.O. BOX EIGHT, SUNLAND, CALIF.

INDEX TO CLASSIFIED ADVERTISING

Albert Pipe Supply Co., Inc. 188
Amenia Sand & Gravel Co. 189
Anderson, W. H., & Co., Inc. 186

Bacon-Pietsch Co., Inc. 190
Blue Ball Machine Works 190
Bonded Scale & Machine Company 186
Brill Equipment Company 189
Bryant, W. K. 189

City Rock Company 191
Consolidated Products Company, Inc. 187
Corson, G. & W. H., Inc. 189

Darien Corp. 187

Erdman, Douglas F., Company 189
Eighmy Equipment Company 186

Foster, L. B., Co. 188
Frank, M. K. 190
Friend, W. H., M. E. 189

General Traders, Inc. 186

Heat & Power Co., Inc. 187
Heidenreich, E. Lee, Jr. 190
Heineken, W. P., Inc. 188
Herbert Sand Co., Inc. 190
Howe, D. A., Sons, Inc. 189

Johnson & Hoehler, Inc. 188

Manley, R. E. 188
McBride, C. C., Co. 188
McLeod, Alex T. 186
Meadville Supply Co. 189
Mid-Continent Equipment Co., Inc. 188
Mississippi Valley Equipment Co. 188
Morrison, Gay 189

Nussbaum, V. M., & Co. 189

O'Neill, A. J. 188

Painted Post Sand & Gravel Co. 187
Palmetto Quarries Co. 189
Pennsylvania Drilling Company 190
Perry Equipment Corp. 188

Ranard, Joe 189

Smith, L. B., Inc. 187
Southern Materials Company, Inc. 188
Stone Building Products, Inc. 188

Tractor & Equipment Company 189
Troyer, Stanley B. 188

Universal Dredge Mfg. Co. 186
Unverzagt, G. A., & Sons 190

Walsh, R. P., & Company 190
Weiss, B. M., Co. 189
Whayne, Roy C., Supply Co. 189
Winter Brothers Material Co., Inc. 188

STEEL

Prompt Delivery from Stock

Some steel products are in short supply but our over-all stocks are still large

Plates, Structurals, Bars, Sheets, Tubes, etc. Carbon, Alloy, Stainless Steels, Babbitt Metal.

RYERSON

Joseph T. Ryerson & Son, Inc. Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco, Seattle, Spokane

this sword challenges CANCER

Under the sign of the cancer sword the American Cancer Society seeks to save lives by spreading vital facts to you, your neighbors, and your physicians . . . by supporting research . . . by providing improved services for cancer patients.

Only under the sign of this sword is there a three-fold, national attack on cancer. Cancer Strikes One in Five. Your Dollars Will Strike Back.

Mail Your Gift to "Cancer" Care of Your Local Postoffice

AMERICAN CANCER SOCIETY

INDEX TO DISPLAY ADVERTISERS

Allis-Chalmers Mfg. Co. 9, 24, 44 Inside Back Cover
Allis Chalmers Tractor Division 4, 5, 13, 132
American Brake Shoe Company American Manganese Steel Division 109
American Forge Co. 120
Armstrong-Bray & Co. 132
Austin-Western Division 29

Babcock & Wilcox Company 8
Baldwin-Lima-Hamilton Corp. 29
Barber-Greene Company 111
Baughman Manufacturing Co., Inc. 179
Bemis Bro. Bag Co. 35
Berg Vault Co. 128
Bergen Machine & Tool Co., Inc. 163
Besser Manufacturing Co. 144
Blaw-Knox Company 185
Boston Woven Hose & Rubber Co. 125
Bradley Pulverizer Co. 116
Bucyrus-Erie Company 98
Builders Equipment Co. 176
Burmeister, L., Co. 176
Butler Bin Co. 171

California Wire Cloth Corp. 110
Carpenter Manufacturing Co. 168
Caterpillar Tractor Co. 11, 15
Cedar Rapids Block Company 182
Chain Belt Company 42, 43, 164, 165
Champion Rivet Co. 129
Chevrolet Motor Division 17
Chicago Pneumatic Tool Company 14
Chrysler Industrial Engine Div. 117
Clark Equipment Company 172
Cleveland Rock Drill Division 6
Cleveland Vibrator Company 168
Clipper Manufacturing Co. 141
Colorado Fuel and Iron Corp. 44, 110
Columbia Machine Works 175
Combustion Engineering, Inc. 27
Concrete Machinery Co. 177
Concrete Transport Mixer Co. 139
Cook Bros. Equipment Company 161
Cross Engineering Company 132

Davis, Frank D., Company 174
Dodge Trucks 25
Duraplastic 134
Dur-O-waL Products, Inc. 182

Eagle Iron Works 46
Ellernan Co. 185
Euclid Road Machinery Co. 119

Farrel-Bacon 118
Frederick Iron & Steel, Inc. 185
Fuller Company 10, 123

Galigher Co. 118
General Electric Company 40, 41
General Motors Corp. 17
Goodrich, B. F., Company 3
Goodyear Tire & Rubber Company Back Cover

Hammond Bag & Paper Company 131
Harnischfeger Corporation 19
Hayward Company 128
Hendrick Manufacturing Company 130
Hough, Frank G., Co. 101

Iowa Manufacturing Company 122

Jaeger Machine Company 169
Johnson, C. S., Company 136, 137
Jones, J. A., Concrete Machinery 170
Jones, W. A., Foundry & Machine Co. 115
Joy Manufacturing Company 20

Kennedy-Van Saun Manufacturing & Engineering Corporation 97
Kent Machine Company 174
Koehring Company 136, 137

Le Roi Company 6
LeTourneau, R. G., Inc. 36, 37, 38, 39
Lincoln Electric Company 124
Link-Belt Company 1, 131

Macwhyte Company 129
Marietta Concrete Corp. 182
Master Builders Co. 183
Mine & Smelter Supply Co. 122
Morris Machine Works 108
Multiplex Machinery Co. 143

Nelson, N. P., Iron Works, Inc. 114
Neptune Meter Company 178
Nordberg Mfg. Co. 23

Oronite Chemical Company 167
Osgood-General 121
Oswalt Engineering Service Corp. 175
Owen Bucket Co. 126

Pettibone-Mulliken Corporation 112, 113
Plymouth Locomotive Works 18
Preco Incorporated 26

Quinn Wire & Iron Works 124

Radio Corporation of America 95
Raymond Pulverizer Division 27
Resisto-Loy Co. 130
Riddell, W. A., Corp. 179
Roebling's, John A., Sons Corp. 48
Ryerson, Joseph T., & Son, Inc. 192

Sauerman Bros., Inc. 116
Schield Bantam Co. 140
Screen Equipment Co., Inc. 107
Service Engineering Company 138
Sight Feed Generator Company 28
Simplicity Engineering Company 185
Sintering Machinery Corporation 128
Smidth, F. L., & Co. 32
Smith Engineering Works 16
Smith, T. L., Company 142
Standard Steel Corporation 12
Stearns Manufacturing Company 184
Stockton Iron Works 106
Stoody Company 93

Texas Company 54
Thermoid Company 50
Torrington Company 22
Towmotor Corporation 166
Traylor Engineering & Manufacturing Co. 7
Truax Machine & Tool Co. 178

Union Bag & Paper Corporation 105
Union Wire Rope Corp. 127
Unit Crane & Shovel Corp. 173
United States Steel Corporation 134
Universal Atlas Cement Company 134
Universal Engineering Corp. 112, 113

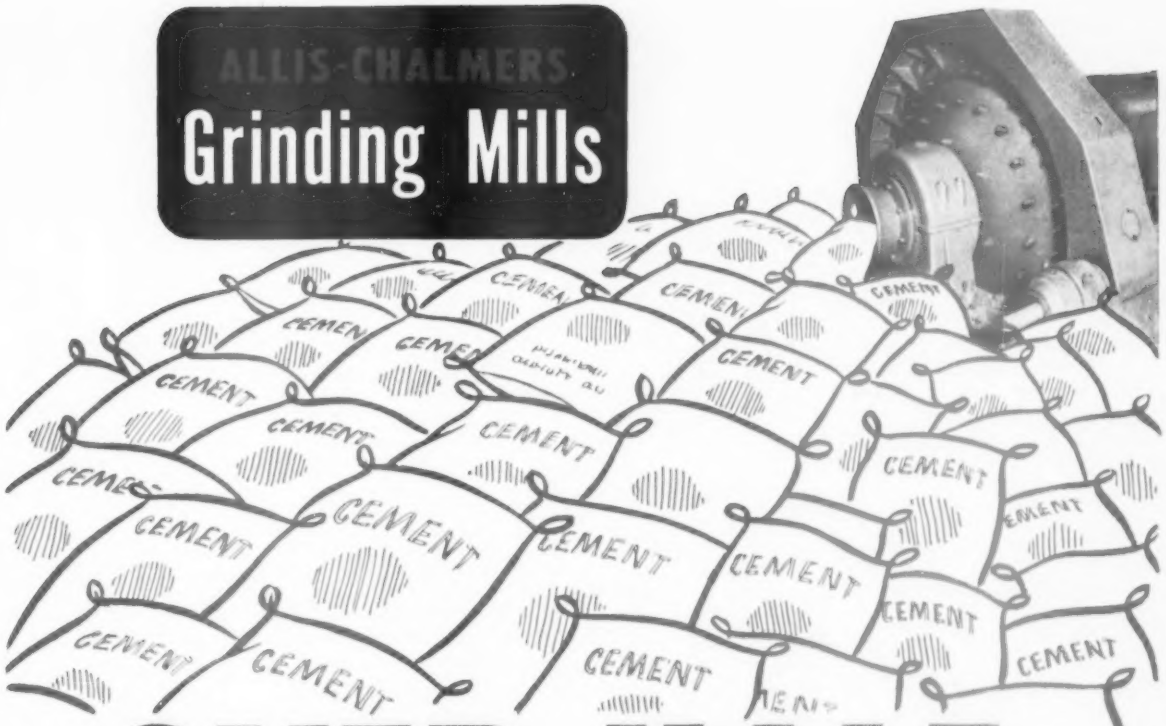
Valley Home & Patio Shop 178
Veriset Corporation 178
Victor Equipment Company 30

Western Machinery Company 21
White Motor Company 31
Wilfley, A. R., & Sons, Inc. 114
Willard Concrete Machinery Sales Co. 177
Williams, C. K., & Co. 170
Williams Patent Crusher & Pulverizer Co. Inside Front Cover
Williams, Roger F., Licensor 177
Winslow Engineering Company 103

Yuba Manufacturing Co. 106, 122

ALLIS-CHALMERS

Grinding Mills



OVER HALF

of all Cement produced in the U.S. is Ground in Allis-Chalmers Grinding Mills!

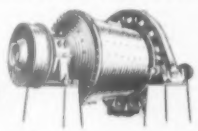
CEMENT PRODUCERS specify Allis-Chalmers grinding mills because they have proved so profitable on the job. In fact, *7 out of 10* A-C mills sold today are repeat orders!

When you specify Allis-Chalmers grinding mills you profit by A-C's *unsurpassed* experience, engineering, testing, erection and parts service. You can be sure of getting the right size and type mill for your job. A-C has built over 4300 grinding mills covering every type of application.

Get more facts from the A-C representative in your area. And write Allis-Chalmers, Milwaukee 1, Wisconsin, for Grinding Mill Bulletin 07B6718A.

A-3996

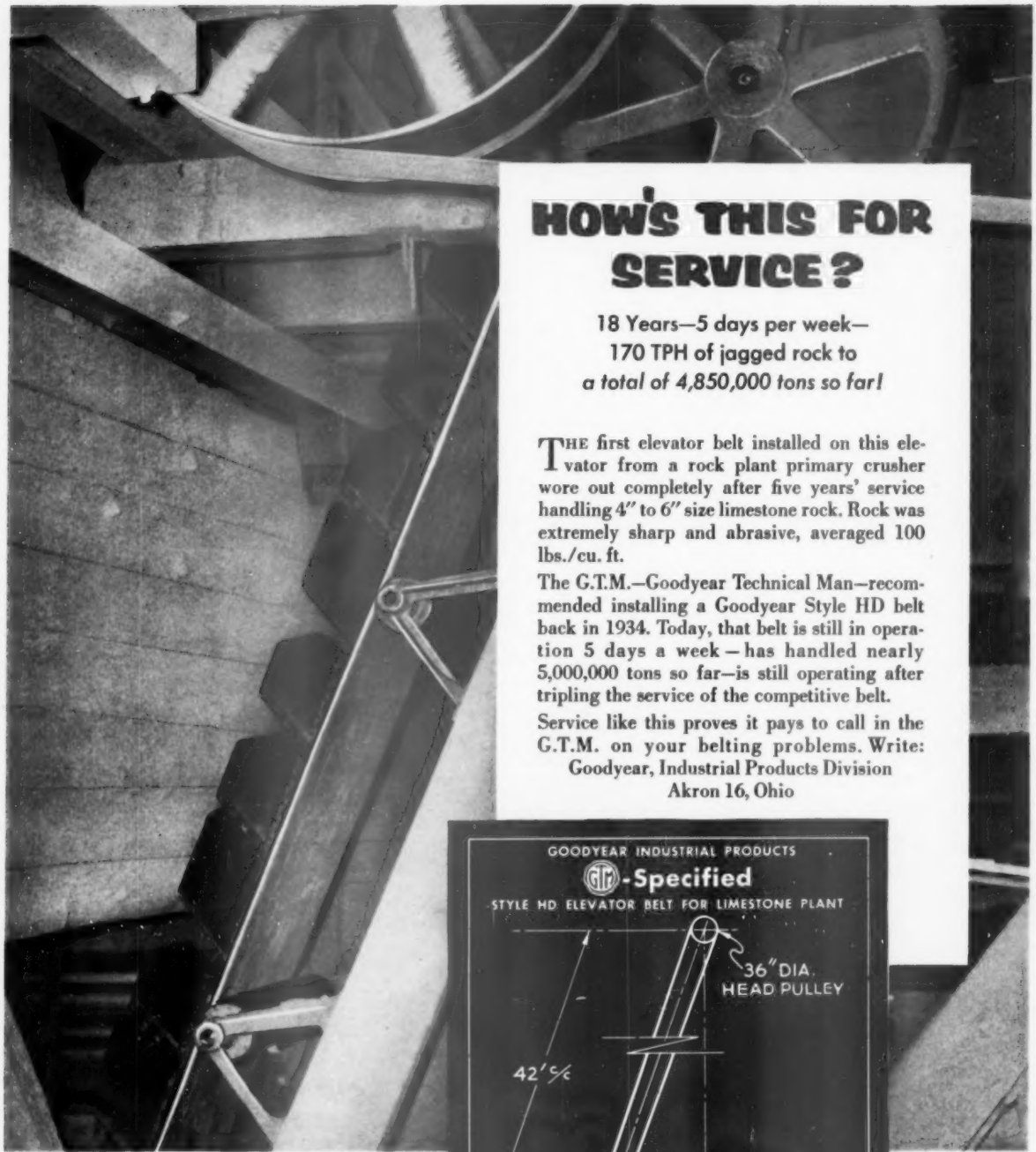
ALLIS-CHALMERS



A-C builds single and multi-stage grinding mills in a complete range of sizes. Special mill modifications and grinding circuits can be engineered to suit your application.

Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.

Vibrating Screens | Jaw Crushers | Gyratory Crushers | Hammermills | Kilns, Coolers, Dryers



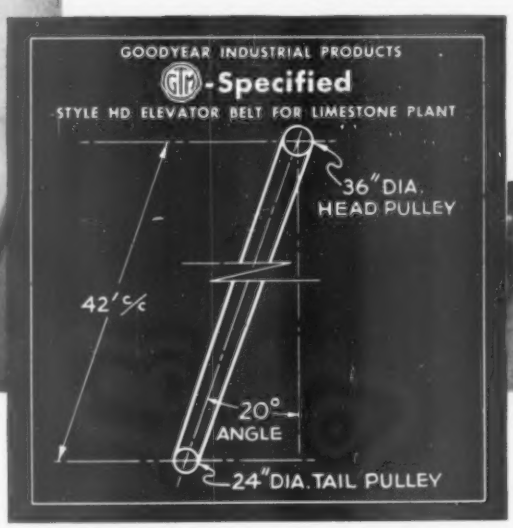
HOW'S THIS FOR SERVICE?

18 Years—5 days per week—
170 TPH of jagged rock to
a total of 4,850,000 tons so far!

THE first elevator belt installed on this elevator from a rock plant primary crusher wore out completely after five years' service handling 4" to 6" size limestone rock. Rock was extremely sharp and abrasive, averaged 100 lbs./cu. ft.

The G.T.M.—Goodyear Technical Man—recommended installing a Goodyear Style HD belt back in 1934. Today, that belt is still in operation 5 days a week—has handled nearly 5,000,000 tons so far—is still operating after tripling the service of the competitive belt.

Service like this proves it pays to call in the G.T.M. on your belting problems. Write: Goodyear, Industrial Products Division Akron 16, Ohio



YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing, Tank Lining, Rubber-Covered Rolls: Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

GOODYEAR

THE GREATEST NAME IN RUBBER